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Public Works and Public Finance

Relief Administrator Predicts More Public Works, Less Dole

IF Harry L. Hopkins, Federal Emergency Relief Administrator, has his way, Federal expenditures on public works and other useful employment will greatly increase, and the "dole" type of relief will greatly decrease, during the coming year.

Just before leaving Paris for Washington on August 15, Administrator Hopkins said, as quoted in a wireless dispatch to *The New York Times:*

"The United States must work out a system of its own in accordance with American conditions of life. There is enough work available to keep every American busy for twenty-five years.

"Americans will not stand for a dole and we are going to put them to work on great public projects and pay them decent wages. There is no loss of a person's self-respect or morale under such a system."

"Beyond Relief: the Larger Task," is the title of an article by Mr. Hopkins, in *The New York Times Magazine* of August 19, 1934, the concluding paragraphs of which follow:

"When, finally, if ever, we shall have attempted to cover each problem with an answer, we ought to find relief at the bottom of the structure rather than at the top. At the top should be industry and agriculture so geared as to give the maximum employment and the maximum wealth in goods to each of its workers and to take a responsibility for a maximum number of our population. Beneath this great roof of private employment should be a permanent structure of public works, responsive to the increase and decrease of the private labor market. It must be organized to contract and expand easily. In order to have integrity either for the individual employed or for the government which creates the employment, the work done must have real social utility, in addition to the fact that it creates jobs. By social utility I mean it must increase the national enjoyment in existence, whether the project is one of slum eradication or cancer research.

"This will be the big net under private employment, designed to catch the workers dropped from industrial payrolls. Of finer mesh than this will be the social safety devices of unemployment and health insurance.

"It is inevitable, until we become physically a better race than we are, that there will be many to sieve through all these safety devices. These will be the unemployables and the social dependents. These social dependents have status and protection under the state laws. Government must take care of its unemployables. We shall probably never be able entirely to dispense with relief. But it can and should be relief with responsibility assumed by the people as a whole and administered for and by the people through their agencies of government—Federal, state and local."

Improved Financial Outlook of American Municipalities

A NUMBER of facts prove that municipal finances are in a much stronger position than they were a year ago or several years ago. Not only are interest rates lower, but many outstanding issues are selling at higher prices; debt is being reduced; salaries are being paid, and in some instances cuts are being restored; many municipalities have withdrawn their applications for PWA loans, believing they can do better in the private market.

Five municipal issues having a face value of $1,004,000 were sold by the RFC last month at a premium of $29,282. The cities are Lynchburg, Va.; Buffalo, N. Y.; Hamilton, Ohio; Littleton, N. H.; Bristol, R. I.; and the prices per $1,000 ranged from a minimum of $1,030.60 to $1,060.50. Two county and two state-highway issues sold at the same time for $1,011.75 to $1,074.

Private investors have bid higher prices for two blocks of sewer and sewage-disposal bonds of the Twin Cities than PWA had contracted to pay. The allotments and reductions because of the private sale are: Minneapolis, $11,526,000, reduced by $1,101,000; St. Paul, $6,522,000, reduced by $888,000. PWA would have received 4 per cent; the private buyers will get 3.52 and 3.39.

In a recent survey by The Associated Press, reporting "the brightest outlook for city financial affairs in the last few years," the following facts, among others, are presented:

Chicago is offering $10,000,000 of refunding bonds to pay 4 per cent until January 1, 1935, and 4½ per cent thereafter until 1954, in exchange for 4 per cent bonds maturing January 1, 1935. In addition, the city has $2,249,900 in the sinking-fund for retirement purposes.

Boston reports delinquent taxes $11,344,000, against $306,000 in 1931; but interest rates are 3.75, from 4.75 last year, and interest on temporary loans is the lowest in 25 years. Worcester sold 2½ per cent bonds at a cost of 1.87, the lowest rate in its history.

Rochester tax returns made possible the retirement of $2,308,000 bonds, and the debt is $50,000,000 instead of $61,000,000 as of 1932. Syracuse tax collections are as good as a year ago; rate on last bond issue, 3 per cent; all payrolls met. Buffalo bond sale of $8,000,000 at less than 4 per cent; tax collections good. Albany bond sale at lowest rate ever recorded.

Cleveland is financed for 1934. Cincinnati is on a cash basis. Milwaukee has a cash balance of $3,849,000, compared with $1,320,000 a year ago. Cincinnati has restored salary cuts made two years ago.

Atlanta had a deficit of $812,618 in 1931, which increased in 1932 and 1933, but not this year. Louisville's financial condition best in three years, with $1,000,000 more collections than last year. Indianapolis debt lower than in last two years; temporary loans at 2 per cent.

San Francisco tax rate 3.48 compared with 3.96 in 1933; city on cash basis; salaries paid, and no outstanding indebtedness; interest rate 3.15 against 5 per cent two years ago; best condition in ten years. Los Angeles rate lowest in more than ten years.

Cheyenne, with 17,000 population, reports this year better than either 1932 or 1933, although those were satisfactory years. Lincoln's bonded debt is $4,141,000, against $3,103,000 in 1931; but a $126,000 building and a $1,800,000 water system have been constructed since then.

In Texas, Austin is on a cash basis as usual; San Antonio expects a tax reduction of 15 to 25 per cent this year; Houston, best in five years, and pays 4 per cent against 4½ in 1932; Dallas within income since 1931 and has retired part of a $2,000,000 overdraft built up from 1929-31; Fort Worth, since 1931, has overcome a cash overdraft of $544,426 in operating fund and now has a cash balance of $37,292.

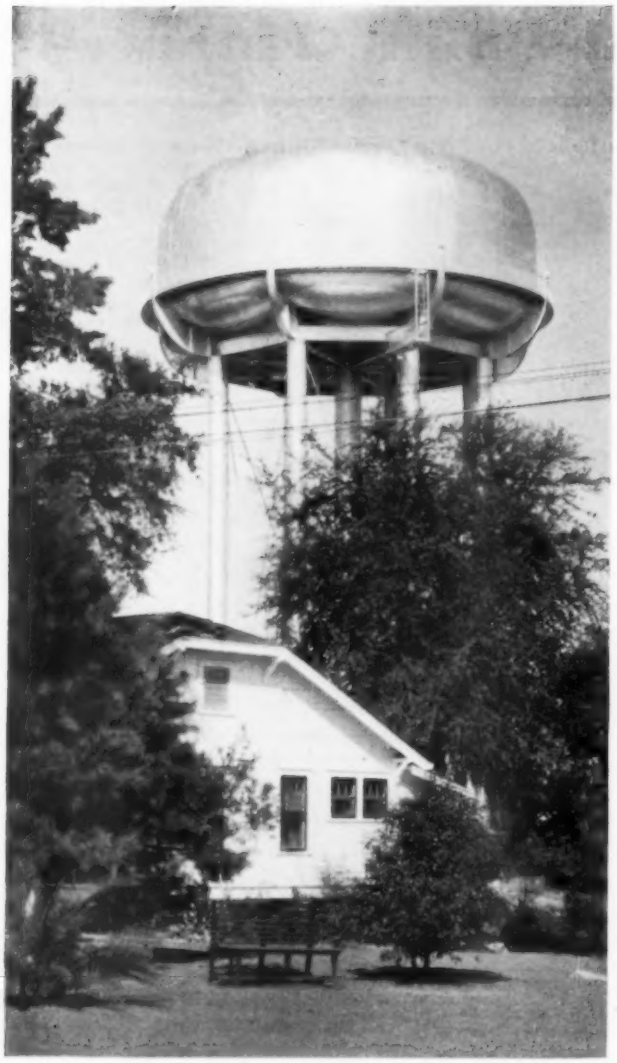
PWA Helps the Schools

THE educational facilities of the nation will be increased by $160,603,032 worth of school, college, university and other educational institution buildings and additions as a result of the Public Works Administration program, Administrator Harold L. Ickes announced on August 14.

A summary of all PWA allotments for school, college and other educational buildings, as of that date, showed the total cost of the new school construction and alteration under the PWA program to be $160,603,032. Of this figure, $126,755,474 was advanced as PWA allotments, the balance coming from local sources.

Under the program PWA allotted $115,798,438 for state, municipal and district school buildings. Construction resulting from these allotments will total $149,645,996, the balance coming from the local school bodies. In addition, PWA advanced $10,957,036 as outright grants to Federal educational institutions for building.

School buildings erected as part of the program dot the map from the small town of Whitefield in northern New Hampshire to Honolulu, Hawaii, and from far northern villages in Alaska to the tropical Canal Zone. The structures include dormitories, university classroom buildings, additions to existing school buildings, new municipal or district schools, new basements, additional study space, gymnasiums, auditoriums, science buildings and swimming pools.



The Colonial Design Is a *shallow-depth* Tank

There is no need to sacrifice operating economy for appearance when installing an elevated tank in a waterworks system. It is entirely possible to build structures, such as the Colonial design, which are pleasing in appearance and, at the same time, shallow in depth.

If you are interested in learning how shallow-depth tanks reduce operating costs, write our nearest office for a copy of THE WATER TOWER containing a complete description of the above installation at Tallahassee, Fla. It will be sent without obligation to you.

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San Francisco.....1033 Rialto Bldg.

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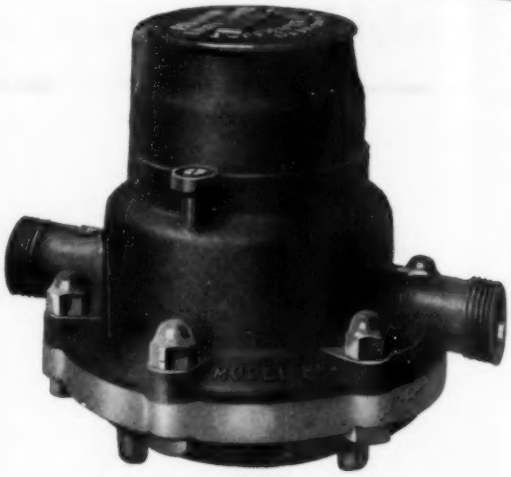

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you obtain these needed features not found elsewhere. They insure maximum return on your meter investment:

Extra-thick reinforced measuring disc minimizes slippage, compels extra accuracy that wins comparative tests.

Frost bottom tested at the factory to break at the proper pressure—500 to 550 pounds. No dependence on flange bolts.

Frost-protected gear train, with gears that separate upon freezing as well as the chamber.

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Precision manufacture so fine that all parts are completely interchangeable and are regularly sold singly,—no matched pairs or unit assemblies needed.

Standard stock meters containing the construction described above will be supplied on request for inspection or testing purposes. Our catalog also gives full description.

Buffalo Meter Company
2902 Main Street Buffalo, N. Y.

NIAGARA (IRON CASE) and AMERICAN (BRONZE CASE) Water Meters

Water Supply and Purification

The Wash-Water Distribution System of Rapid-Sand Filters

IT is customary to give the name "underdrain system" to the arrangement of gravel, screens, strainers, piping or other devices that stand between the bottom of the filter sand and the main effluent pipe of the filter. This name is rather unfortunate, since it places the emphasis on only one of the two functions of the system, and that the least important. If the arrangements were only for the purpose of draining away the filtered water, they could be much simpler and less expensive than is actually necessary. The conditions while the filter is being washed determine the construction. The name "wash-water distribution system" is too long for general use, but it describes better the purpose of the devices in question. The velocity of the water in the distribution system during washing is generally from seven to thirteen times as great as that during filtration. Thus, if the pipe sizes, orifice openings and pores of the gravel are large enough to handle the wash water, they are much more than ample during filtration.

There is no other feature of filter design where practice is so diversified as is the case with filter-bottom arrangements. To make even brief mention of the various devices that have been adopted would take too much space. Many of the plans adopted may have been entirely suitable under the special conditions where they were used, but need hardly be considered for ordinary conditions. If the water to be filtered is very aggressive to iron and steel, or if certain sizes of gravel cannot be obtained at reasonable cost in the locality, then special methods of construction may be advisable. For most conditions, however, satisfactory results can be obtained with a perforated pipe system and graded gravel layer of conventional type. Certain details require careful attention. The pipe sizes must be large enough so that the loss-of-head is not excessive at the washing rates used. High velocities also introduce another complication due to the recovery of velocity head. This phenomenon could be prevented by the use of tapering pipes, but these are impractical. Using cylindrical pipes, the velocity decreases and the pressure increases as portions of the water leave the pipe at each orifice. The effect of friction is to make the pressure decrease along the pipe in the direction of flow, but the recovery of velocity head usually more than offsets this, so that the pressure in the distribution system is greatest at the dead ends of the lateral pipes. The tendency of this is to make those portions of the bed where the pipe velocity is high receive less than their proper share of the wash water. The difficulty can be largely overcome by designing the pipes large enough.

It is the aim of the distribution system to produce a uniform upward velocity of wash water at all points in the sand bed. Under practical conditions, however, it is inevitable that there should be some variation in the amount of resistance offered to the water in different places in the bed. For the reasons above stated there will also be some variation in the pressure in the different parts of the pipe system. The method usually adopted for overcoming both of these difficulties is to introduce a definite and rather large amount of resistance in the form of an orifice at the point where the water leaves the lateral pipe and enters the gravel layer. By making the drop in pressure large enough, the other variations in pressure become unimportant and the upward velocity of wash water is substantially uniform at all points over the area of the bed.

It has recently been shown that it is a very difficult thing, on a commercial basis, to drill in a steel pipe a row of holes having uniform hydraulic characteristics. Some of the difficulty is due to wear or variation in drills, causing slight but important differences in the diameters of the holes. An even more important cause of trouble may be the presence or absence of slight burrs at the inside ends of the holes. These would have considerable effect on the discharge. Neither of these reasons seems to explain the difficulty completely, but the fact remains that the holes do not discharge uniformly even when they are drilled with considerable care. This, together with the danger of rusting in a plain hole through the pipe wall, makes it wise to use bronze or brass bushings in the holes unless some one of the common types of strainer is to be used. It is much easier to secure exact uniformity of dimensions in bushings or strainers that are separately manufactured than it is in holes that are drilled in the pipe. It also seems wise, at least in the case of bushings, that they should project a short distance inside the interior wall of the pipe. This makes the entrance conditions more nearly uniform for all orifices and minimizes the disturbing effect of any burrs that may be present.

ACKNOWLEDGMENT.—From a paper presented before the Southeastern Section, American Water Works Association, by A. B. MORRILL and W. M. WALLACE, Assistant Engineer and Superintendent of Filtration respectively, Detroit, Mich., on "The Design and Care of Rapid-Sand Filters."

A Good Point to Remember

AS an introduction to their paper on "The Design and Care of Rapid-Sand Filters," presented before the Southeastern Section, American Water Works Association, A. B. Morrill, Assistant Engineer of Filtration, and W. M. Wallace, Superintendent of Filtration, Detroit, Mich., present a paragraph which should be read, studied and thought over by every water-works man who has anything to do with filtration. We reproduce it for your study:

"At the risk of bringing down the wrath of some sanitarians, it will be stated that the real purpose of rapid sand filtration is to remove turbidity, odor, taste and color from water. It is not to remove bacteria, although the process actually does remove a large proportion of those present. If the standards of removal of turbidity are as rigid as they should be, the removal of bacteria will be correspondingly high, so that the cost and difficulty of the later sterilization will be decreased. Under most conditions, however, if the filters remove practically all of the turbidity, odor, taste and color from the water, they have done all that should be expected of them, and any further disinfection that may be necessary should be accomplished by other means."

Statistics of the Chicago Water Works, Year Ending December 31, 1933

Population of Chicago (estimated)	3,681,265
Date of construction	1852 to date
By whom owned	City of Chicago
Source of supply	Lake Michigan
Mode of supply	By gravity from intakes 2 to 4 miles out in Lake Michigan through tunnels to pumping stations. Direct pumping into mains.

WATER CONSUMPTION

Population of Chicago (estimated)	3,681,265
Pop. of outside communities supplied through Chicago water-works system	400,207
Total population supplied	4,081,472
Pumpage, city of Chicago—gals.	365,110,126,510
Water delivered through meters to towns outside Chicago—gals.	13,565,873,490
Total net pumpage of water system—gals.	378,676,000,000
Water passed through meters within Chicago city limits—gals.	97,330,235,010
Percentage of water consumption metered—city	26.66
Average daily consumption in Chicago—gals.	1,000,301,716
Gallons per day to each inhabitant—city	271.73

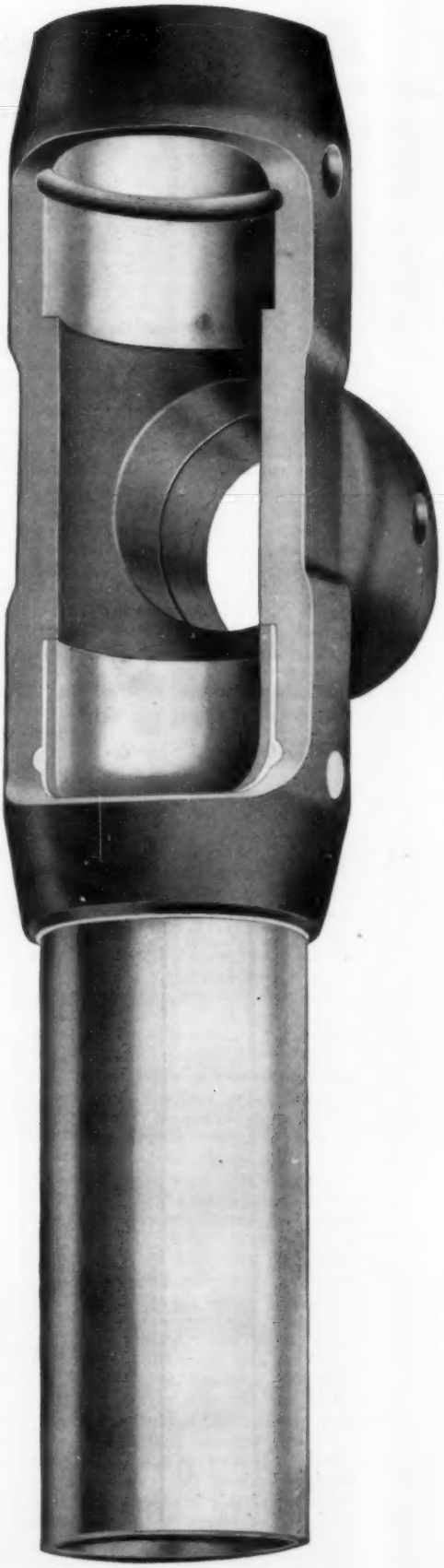
SERVICES

Kind of pipe and sizes	Lead—¾" to 2"—Cast Iron—3" to 16"
Assessed services	303,671
Metered services in use	112,984
Metered services (meters temporarily removed)	3,146
Total services	416,655
Meters installed during the year	4,572
Revised list of meters now in use	112,984
Percentage of services metered	27.12
Revenue from assessed rates	3,447,193.77
Revenue from metered rates	8,871,688.68
Percentage of revenue from metered rates	72.01

DISTRIBUTION SYSTEM

Kind of pipe	Cast Iron
Size (inches)	4" to 54"
Extended—miles	15.82
Discontinued—miles	4.75
Total in use—miles	3,723.69
Hydrants added during year	630
Hydrants abandoned during year	563
Hydrants now in use	39,586
Gate valves added during year	441
Gate valves abandoned during year	142
Gate valves now in use	35,719
Pressure range in mains—lbs. per sq. in	25 to 65

LET'S LOOK INSIDE



● Look through a section of STREAMLINE Copper Pipe and Fitting—here are no rough projections, inside shoulders or abrupt pipe ends. The inside is uniformly smooth. The pipe is evenly recessed into the fitting forming a flow area which is uniform and unrestricted through pipe and fitting. There are no anchorage points for foreign matter to accumulate, lessen the flow and eventually clog the pipe.

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Send for Catalog W-3 illustrating the complete line of STREAMLINE Fittings and Copper Pipe

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JAMES GARBERG
Supt. of Equipment, State
Highway Department,
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E. A. WOOD
Chief, Street Cleaning Division,
Department of Health
Winnipeg, Man., Canada

HARRY W. FLEDDERMAN
Division of Street Cleaning,
Louisville, Ky.

EDWIN A. MILLER,
Supervisor of Maintenance,
Rochester, N. Y.

Officers and Board of Governors of International Association of Public Works Officials, Meeting in Rochester, September 26-28, 1934, for Their Fifteenth Annual Conference

CHAS. T. HVASS
President, Mfrs. Division,
I.A.P.W.O., New York

Heavy-Duty Floors

READY FOR USE

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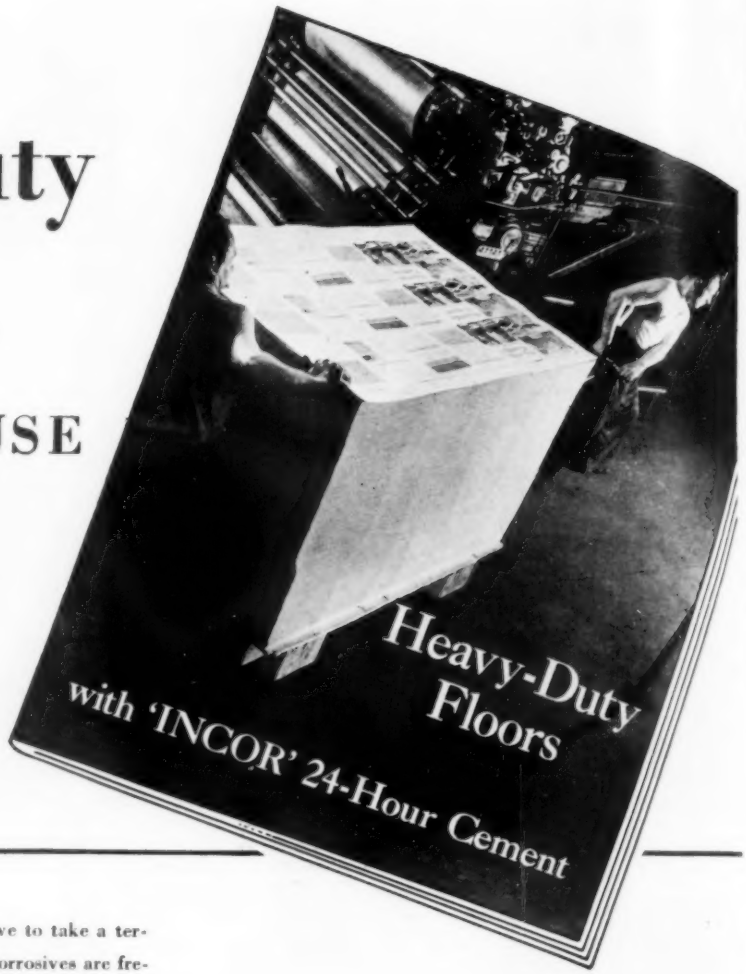

Most industrial floors have to take a terrific 'beating.' Steel-tired trucks, acids and corrosives are frequently encountered. So, in addition to adequate strength, a heavy-duty concrete floor also has to have exceptional durability. That means good materials and skilled workmanship—and, above all, adequate curing.

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*Name*_____

*Address*_____

Mention THE AMERICAN CITY—it helps.

Public Works Data – Highway Construction

Engineering Data Brought Up to Date in PWA Program

THE Division of Highways, Cincinnati, Ohio, anticipating a limited construction program during 1933, plunged into a program of bringing up to date engineering data, neglected for several years because of construction pressures. This program was well under way when the entire aspect was changed by the public works program sponsored by the Federal Government. All efforts were immediately directed to making surveys and preparing plans and estimates for carrying out this construction program. At the close of 1933, plans, etc., were completed on 43 projects, of which 17 had been carried to the point where bids could be taken and the remainder completed shortly thereafter.

There was a considerable upward trend in construction prices toward the end of 1933, due to the efforts of the National Recovery Administration. The rise was reflected to a degree in contract prices. A tabular comparison of unit prices from 1920 through 1933 is shown below.

	1920	1925	1930
Grading	$1.00	$0.70	$0.40
Concrete for base	12.49	8.90	7.42
Concrete pavement 7"	3.36	2.80	2.28
Concrete pavement 8"	....	3.05	2.46
Concrete pavement 9"	....	3.40	2.42
Asphalt pavement	2.45*	2.40	1.39
Brick pavement	2.81*	3.35	1.95
Granite, reset	3.35	3.35	2.35

	1931	1932	1933
Grading	$0.40	$0.20	$0.30†
Concrete for base	5.90	5.10	6.93
Concrete pavement 7"	2.04	1.71	2.35†
Concrete pavement 8"	2.01	1.86	1.87
Concrete pavement 9"	2.10	1.76	1.91†
Asphalt pavement	1.40	1.30	1.32
Brick pavement	2.17	....	....
Granite, reset	2.40	....	....

* None laid in 1920—Average of 1919 and 1921.

† Do not include Montana Avenue, the one bid received in the fall of the year having been rejected. Fixed by one small job, let late in year.

The tabulation below gives the total quantities of main contract items completed during 1933, compared with 1932.

	1932	1933
Pavements	251,000 s. y.	42,400 s. y.
Cement walks	271,000 s. f.	109,200 s. f.
Concrete driveways	50,500 s. f.	13,000 s. f.
Main sewers and drains	35,300 l. f.	10,600 l. f.
Inlet connection pipe	6,100 l. f.	2,280 l. f.
Storm-water inlets	370 ea.	94 ea.
Water mains	11,100 l. f.	5,200 l. f.

C. A. DYKSTRA,
City Manager.

Road Being Built to 6,642-Foot Level in Great Smoky Mountain

CLINGMAN'S DOME, the second highest point east of the Mississippi River, with an elevation of 6,642 feet above sea-level, will be made accessible by a new road now under construction. The alluring scenery of the Great Smoky Mountains National Park can be viewed to advantage from the top of Clingman's Dome and from many points on the road along the crest of the Great Smokies.

Like the prongs of a Y, two roads extend, one from North Carolina and the other from Tennessee, to the point where the two states meet at Newfound Gap. From this gap a single road, forming the stem of the Y, climbs 1,600 feet along the crest of the Great Smokies to the top of Clingman's Dome, which is on the line between North Carolina and Tennessee.

The old road to Newfound Gap from Gatlinburg, Tenn., winding through beautiful mountain country, is being widened to 30 feet and surfaced 20 feet wide on a 14-mile section. The new road from North Carolina to Newfound Gap already has been surfaced by the North Carolina Highway Department and the Bureau of Public Roads forces. From Newfound Gap, where ample parking space is being provided, the 8-mile section of new surfaced road to the top of Clingman's Dome is now under construction.

There were 200 men at work on these mountain roads during the winter. Local labor and material are being used for the work. This road construction for the Office of National Parks, Buildings and Reservations of the U. S. Department of the Interior is being done by the Bureau of Public Roads, using funds appropriated by the Public Works Administration.

Properties of Concrete Studied in Test Section

AN abstract of a report on laboratory and field tests of the Bayshore Highway Cooperative Investigation has recently been issued by the Highway Research Board of the National Research Council. The report gives the results obtained during 1933 of a series of investigations into the properties of concrete used in the construction of a test section of the Bayshore Highway near San Francisco, Calif. The primary purpose was to compare the effects of various cements upon the qualities of concrete pavements. Both laboratory and field tests indicate no marked differences in strength, durability or volume changes among the twelve different cements tested; but there was a very pronounced curling action of all slabs due to drying of the top while the bottom remained moist. This curling action is shown to be more important than the volume changes of the slab as a whole. The results indicate that factors other than the cements may be varied to control the curling and volume changes.

A number of interesting facts were observed, particularly in the field tests. The maximum temperature of concrete after casting was influenced to a large extent by the temperature conditions during and soon after casting, the greatest maximum temperature developing in concrete cast near noon. The temperature rise, due to the heat of hydration, for high early strength cements was approximately 6 degrees F. greater than for either standard or special cements.

The maximum contraction of the slab as a whole due to temperature changes, including the drop from the hardening temperature to normal and including the daily and seasonal variations, for the average of all cements was approximately 5/16-inch per 100 feet of length. For high early strength cements, the contraction was greater than for standard cements, due to their higher temperatures of setting. The contraction of the slab as a whole due to causes other than temperature change, chiefly drying, was, up to the age of one year, somewhat greater than $\frac{1}{8}$-inch per 100 feet of length. The indications are that the contraction at the end of the present dry season will not greatly exceed $\frac{1}{8}$-inch per 100 feet, or approximately 1/10 of that which would occur in a slab subject to drying throughout. The contraction was not greatly different for the individual cements, and the high early strength cements showed no greater contraction than the standard cements.

The daily curling of slabs due to temperature change was sufficient to produce an alternate rise and fall of the ends of an unrestrained 20-foot slab of 1/16-inch downward during the day and 1/16-inch upward during the night, or a total range of $\frac{1}{8}$-inch. The curling of slabs due to drying, up to the age of one year, was sufficient to cause the ends of an unrestrained 20-foot slab to rise 5/16-inch. The indications are that the curling occurring during each dry season is only partly compensated by the curling in the opposite direction during the subsequent wet season; hence a residual or permanent curling gradually accumulates.

Within the first year, the contraction of the slab as a whole, due to moisture change, was only 50 per cent of that due to temperature change; while the curling of the slab due to moisture change was five times that due to temperature change.

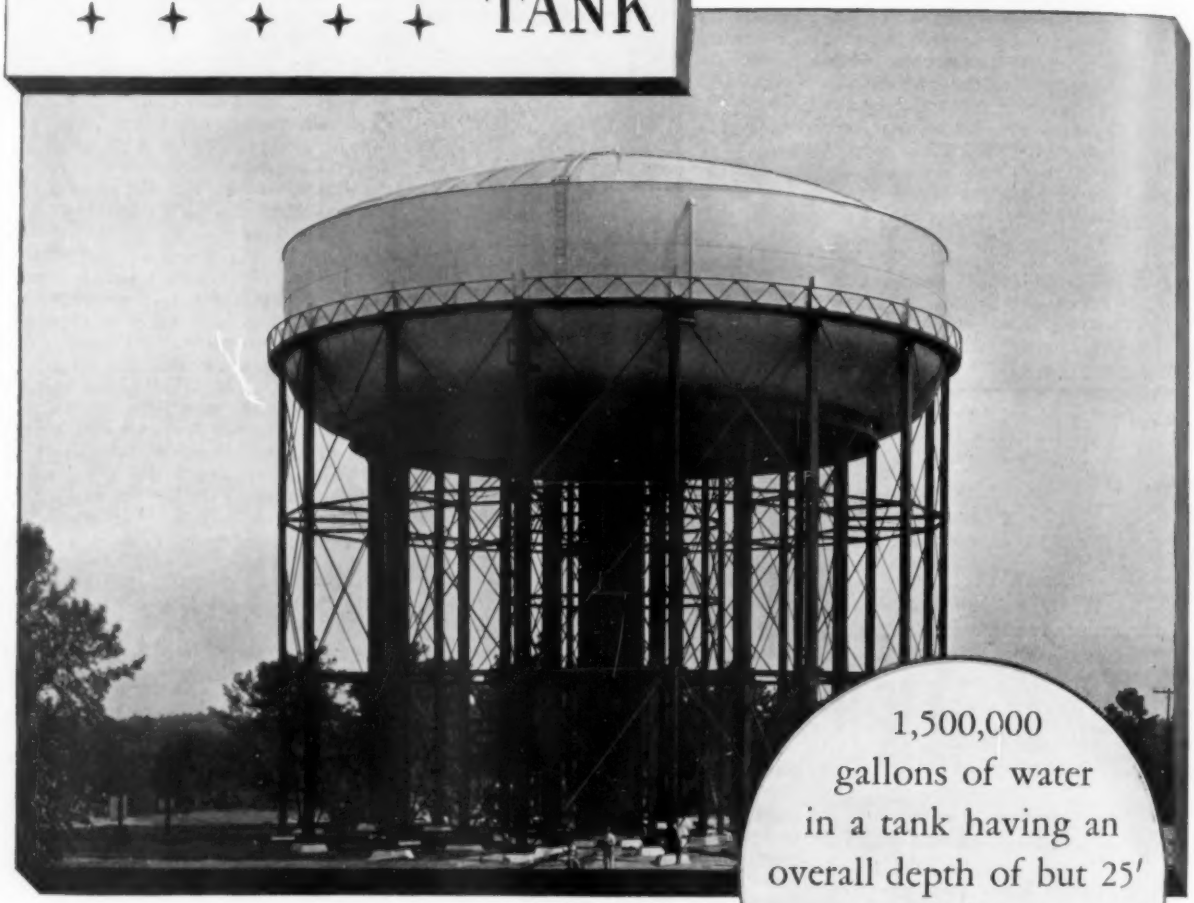
Surface cracks of varying width up to about 0.002-inch developed in all field test slabs, due to non-linear variation of temperature and of the moisture content from the top to the bottom. The surface cracks were largest and most numerous in the field test slabs for the cement which exhibited greatest contraction under the extreme drying conditions of the laboratory tests. Likewise, the surface cracks were smallest and least numerous for the cement which exhibited least contraction in the laboratory tests.

Daily variations in the temperature of the field test slabs were greater for cements of darker color, as would be expected. Slabs differing only in natural color differed by as much as 8 degrees F. in surface temperature when the sun was shining.

Street Maintenance Cost, Greeley, Colo.

Greeley's per capita maintenance cost should have been given as $1.61 in the table on page 9 of the August issue of THE AMERICAN CITY, where it was incorrectly stated to be $3.72.

THE *New* LOW HEAD RANGE TOROIDAL BOTTOM TANK



1,500,000 gallons of water in a tank having an overall depth of but 25′ at Columbia, S. C. Diameter 102′ 9″ Ht. to top 87′

Economically meeting the requirements of a large capacity of water stored under a low range of head, between the full and empty mark, a "Pittsburgh-Des Moines" Toroidal Bottom Steel Tank is the answer to your pressure and pumping problems.

Write our nearest office for full information on this type of tank, and request a visit by one of our representatives. He can advise you on what amount of storage you need and where it should be located. He can then give you an estimate of the cost of the installation.

Pittsburgh-Des Moines Steel Company

Pittsburgh, Pa.....3412 Neville Island
Des Moines, Ia.....913 Tuttle St.
New York City.....Room 915, 270 Broadway
Chicago, Ill.....1216 First Nat'l Bank Bldg.
Dallas, Texas.....1217 Praetorian Bldg.
San Francisco, Cal.....619 Rialto Bldg.

PITTSBURGH DES MOINES

When you write for that catalog, kindly mention THE AMERICAN CITY

Sewerage and Sewage Disposal

Methods of Removing Sewage Sludge from Sedimentation Tanks

THE early units for sludge collection were adaptations of units that had been successful in other fields, but the later ones have been designed regardless of their application to other uses and have been made to meet the severe conditions existing in sewage works operation. Much attention has been given of late to architectural and esthetic consideration to permit the sewage plant to take its place with other municipal utilities in presenting an attractive appearance.

The early units brought out clearly that this type of sludge collector had many inherent advantages, which broadly are:

1. Continuous sludge collection allows the construction of shallow tanks, thus reducing plant construction costs.

2. Fewer tanks are needed, since continuous operation and sludge collection remove the necessity for periodical shutdown and unwatering. Many plants today have one mechanically cleaned tank and have operated successfully for years; in some cases the liquid has not been drained down for four to five years.

3. Elimination or reduction of surface scums, as removal of solids while still fresh, prevents gas formation and buoyant particles.

4. Removal of sludge daily in volumes equal to the amount deposited maintains maximum volumetric efficiency of the tank at all times.

5. Less odor from the sedimentation step, and better appearance of plants, due to absence of scum on the surface of tanks.

The first units were built for central drive with a central shaft and were used in circular tanks. A later type was developed for square tanks. This was still operated by central drive but with an articulated end on two of the arms, which swept out into the corners of the tank. The use of square tanks introduced several additional factors of economy, such as the use of common walls between tanks, cutting down concrete quantities, and made possible the more efficient use of ground area.

The first units also used the truss bridge construction spanning the tanks for supporting the mechanism. A later unit differed from the original in that it was propelled by a motor drive located at the wall end of the truss or oscillating bridge. This drive moves the carriage around on a rail laid on the tank wall. The entire mechanism turns on a concrete pier in the center of the tank, and the truss arm, which extends to the wall, retracts and expands as the drive unit follows the wall of the square tank, so that the corners, as well as the center of the tank, are raked free of sludge.

The latest development is a unit for either circular or square tanks, with a central hollow pier which serves as the sewage inlet. The sewage flows outward to the peripheral overflow weir with constantly decreasing velocity favorable to the efficient removal of solids.

For rectangular tanks, a mechanism was developed by W. M. Piatt, of Durham, N. C., in 1920, for use at the activated sludge plant designed by him for Gastonia, N. C. This consisted of two long chains supporting between them sludge scrapers of wood. The chains were driven by a motor at the top of the tank, and the wooden flights dragged the sludge along the tank bottom to a sump at the inlet end, from which it was lifted by air. Later developments of this type have been the addition of extra sprockets to cause the chain to pass near the surface of the tank on its return journey and use the same flights to convey scum to a trough at the outlet end of the tank. Another type of mechanically cleaned settling tank, recently developed, consists of a revolving mechanism, driven from a central shaft, but instead of plows to rake the sludge, the arms are provided with nozzles, through which the sludge is removed by means of hydrostatic pressure.

Where sewage is adequately pre-treated by bar screens, the scum formation on a primary unit will be small, but in cases where greasy wastes are present, light scums may appear on the surface of any sedimentation unit. Such scum is objectionable in appearance and may cause odors and breed flies. It is therefore common practice now to provide a skimming arm on the clarifier unit. The scum is discharged directly into containers and may be burned with screenings or in some cases put into the digestion tanks.

—From a paper on the mechanization of sewage treatment, presented by EDMUND B. BESSELIEVRE, Sanitary Engineer, The Dorr Co., before a joint session, Public Health Engineering Section, American Public Health Association, and Central States Sewage Works Association.

Welcoming Visitors to a Sewage Treatment Plant

ONE of the most important duties of the responsible plant operator is to make his plant attractive, as well as instructive, to visitors. This statement is based upon the fundamental fact that the visitor is usually a "stockholder" whose dividend is the best results obtainable for the least outlay of his cash. Being a stockholder, he has the right to know something about his plant. Given this opportunity, he becomes proud of his ownership and is ready both to pay for and to defend the plant.

The following schedule details the plan used at Aurora, Ill., for the reception and care of visitors.

A. A well-planned road-sign names the plant and announces that visitors are welcome.

B. A statement of policy in the main entrance hall, addressed to the visitor, makes him welcome and directs him how to go about.

C. Just within the entrance door is placed an attractive registration desk with proper equipment and always with fresh flowers in season.

D. On the main floor of the pump room, in full view from the entrance door, is placed a school of instruction. Here are gathered together:

1. A picturized plan of the plant.
2. A table with sample exhibits from each step in the process, properly carded.
3. A full-sized sectional model of the trickling filters, arranged behind plate glass, showing the nozzle, stone and collecting tile in section.
4. An illustrated flow diagram.
5. An illustrated chart showing the total removals by steps for the preceding year.
6. A complete file of monthly data sheets.
7. Picture groups of eight or ten neighboring plants.
8. An attractive 4-page leaflet, easy to read, carefully details the purpose, fundamental principles and general operation step by step in layman's language.

E. All department doors are labeled.

F. In each department is placed a framed statement of the nature of the operation in that room, so that the visitor may read his way about as he goes.

G. On Sunday, operators change to clean, neat uniforms and are at the disposal of such visitors as care to be shown about.

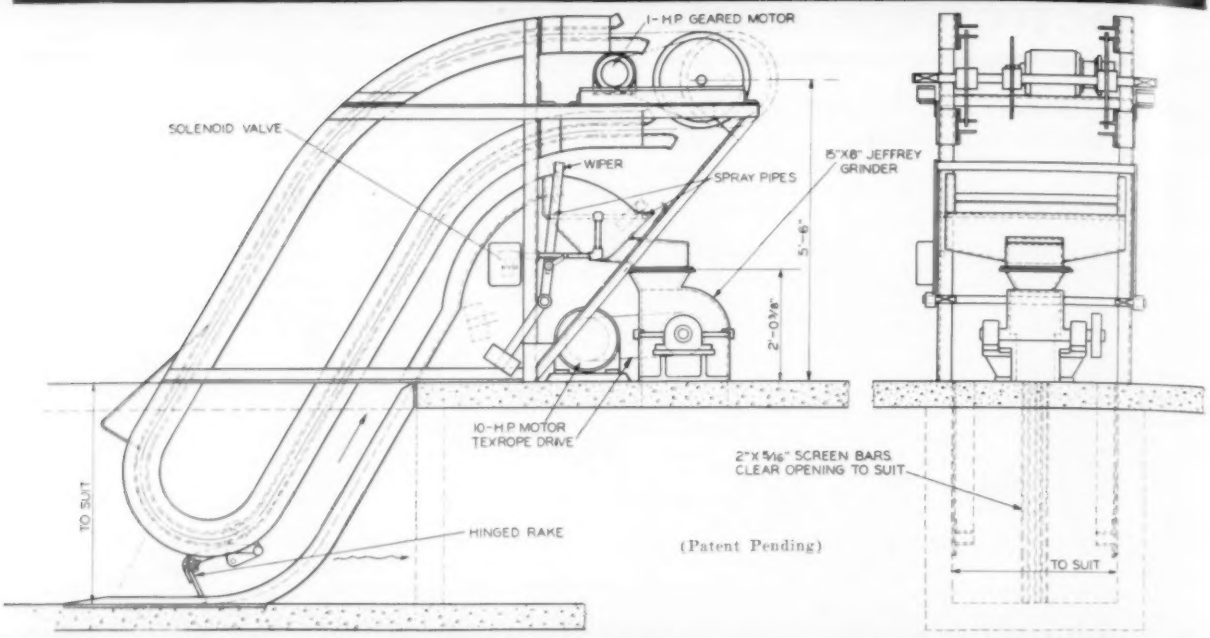
H. Convenient walks communicating to all parts of the plant invite inspection.

I. The plant is thoroughly cleaned up every Saturday afternoon, with careful attention to clean windows, walk-ways, cobwebs, tools in order, etc.

With such an arrangement, if it is a busy morning, a visitor can be greeted in a few minutes and generally directed as to how to find his way about. He, appreciating the situation, finds himself enjoying his own ability to read his way intelligently. He leaves to come again and bring a friend, proud of the plant and ready to defend it. Without these arrangements and left to wander about, he finds himself in a hopelessly confused tangle of things he does not understand, and leaves dissatisfied without quite knowing the reason why.

Whenever possible, the visitor should be piloted about. This particularly applies to groups, the visit always being preceded by a short talk or lecture in the school, which prepares the visitor for a proper understanding of things he has come to see. The trip should always parallel as closely as possible the sewage flow, so as not to confuse the visitor as to the sequence of processes. The writer is convinced that no similar effort in any other undertaking about a sewage treatment plant will return such enduring and valuable dividends to the plant.

—From a paper presented by WALTER A. SPERRY, Superintendent, Aurora Sanitary District, Aurora, Ill., before the fifteenth annual Iowa Sewage Treatment Conference.



The Only Way

of Adequately Disposing of Sewage Screenings . . .

Jeffrey has solved a difficult problem . . . you can NOW actually dispose of sewage screenings effectively and satisfactorily. The Jeffrey combination . . . Self-cleaning Bar Screen and Screenings Grinder (see illustration) . . . does the trick. It works . . . it is simple, yet effective and you can absolutely rely upon this combination to do the job right.

The Self-cleaning Bar Screen has safety features not found in other screens:

Special hinged Scraper prevents jamming of the mechanism.

Rake teeth pass entirely through the screen, cleaning not only the surface but the space between the bars.

No auxiliary channel is necessary . . can be cleaned by hand if power fails.

No accidents . . No unsightly and smelly pile of screenings lying around.

Screenings are disposed of as fast as they accumulate. No hand work.

Screenings flushed into and through grinder by spray water.

The Jeffrey Grinder actually reduces the screenings to a pulp, which readily passes into the sewerage system. It does not tear the screenings into long strips or strings that will eventually clog the pumps.

This combination Screen and Grinder operates continuously or at intervals of from one to 60 minutes by the clock, which starts everything . . . spray water, screen and grinder . . . at once. When the equipment is on intermittent operation, the screen makes one revolution and stops . . . grinder and spray water continue a sufficient length of time to dispose of screenings; then, grinder and water stop until the screen is started again.

Let us give you complete details covering this compact, automatic unit. A competent Sanitary Engineer will be glad to help you solve your Sewage Disposal problems. Write today.

Jeffrey Sewage Disposal Equipment:

Bar Screens
Sludge Collectors
Grit Channel Conveyors
Screenings Grinders
Dried Sludge Grinders
Conveyors & Elevators
Green Garbage Grinders
Coal & Ash Handling Machinery

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Jeffrey Manufacturing Company, Ltd., of Canada

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Waste Disposal and Public Service

Incinerator Would Cut Garbage Disposal Cost in Half

A REPORT recently made to the Common Council of Schenectady, N. Y., states that the city can dispose of its garbage and rubbish for less than half the cost of operation of the garbage reduction process, and at a considerably less cost than the present dehydration process, if an incinerator is constructed. Leroy Purdy, City Engineer, and Morris M. Cohn, Sanitary Engineer, reported on the methods of disposal in twelve cities after studying the operation of their incinerators. While it was found that costs of operation vary greatly from city to city, it was felt that Schenectady can incinerate mixed garbage and rubbish at a cost of $1.50 per ton, including labor, maintenance, and other operating costs, which will bring the annual cost of operation to about $20,000.

In 1931, the last year of operation of the garbage reduction process, the net cost of operation of the Bureau of Garbage Reduction was approximately $48,000, in comparison with a net cost of approximately $37,000 in 1930. This increase in net cost resulted from the poor market for grease and tankage by-products from the reduction process.

Since January, 1932, the reduction plant has been operated for the simple dehydration of the green garbage of the city. In both 1932 and 1933 the net cost of operation amounted to approximately $32,000 yearly. The budgetary appropriation for 1934 is approximately $24,500.

The incineration plant operation for the total garbage and rubbish collected in Schenectady would cost $28,000 less than what was expended on garbage disposal alone during the last year of operation of the reduction process. The cost will be $12,000 less than required for the simple hydration of garbage alone during the years 1932 and 1933, and will be approximately $5,000 less than is provided for in the 1934 budget of the Bureau of Garbage Reduction.

At these reduced costs, all rubbish will be given complete sanitary disposal, dump maintenance costs will be canceled and all the public health menace and inconvenience caused by dumps will be completely eliminated. In addition, collection costs will be reduced by the ability of the forces to collect both garbage and rubbish combined for final disposal in mixed form at the incinerator. Further, the cost of long hauls which face the city now with the closing of nearby dump areas, will be prevented. The incinerator will make the city independent of the dump situation.

One Hundred Years of Public Service in Toronto

THE city of Toronto, Ontario, during 1934, is celebrating the 100th anniversary of its incorporation as a city. From a thriving town with a population of 9,254 in 1834, it has grown into an industrious city with a population of 623,562. With the development of the city during this period, came the attendant problems for the improving of public services for the health and comfort of its citizens, and not the least of these services was the cleaning of public thoroughfares and the collection and disposal of household waste material.

It is questionable whether there was any street-cleaning service in the earlier days, but with the development of roadways came the horse-drawn rotary broom, hand broom sweeping, scraping, mechanical sweepers, and finally motor flushers. The two-wheel dump-cart was the earliest type of vehicle employed for the collection of refuse, followed by a small type wagon, then the roller type rear dump-wagon and trailer. In latter years the motor truck has rapidly replaced the horse-drawn vehicle for collection services.

The disposal of refuse prior to 1890 was by dumping in swamp and low-lying areas. The first incinerator, or crematory, as it was called, was built in 1890. In 1917 the first high-temperature destructor with a capacity of 180 tons per day was placed in operation, followed by a second plant with a capacity of 400 tons per day in 1925.

This centennial year will see the completion and operation of a third plant, with the most modern equipment, and a capacity of 500 tons per day. The operation of these three plants will permit the disposal of all combustible and offensive waste material by incineration.

GEORGE W. DIES,
Street Commissioner.

Busy, Busier, Busiest

Dedicated to the International Association of Public Works Officials

We're the busiest bunch of workers
That ever you will find;
To stop a day would start decay;
We can't be dropped from mind.

We clean the sewer basins,
Cut grass and prune the trees;
We sweep the dirt from off the streets—
The filth that spreads disease.

We take away the ashes,
The garbage—food for rats;
We starve the flies and kills the smells;
We bury dogs and cats.

We mend the broken pavement,
Fill hollows in the street;
We make the bridges safe and sound—
Our fixing can't be beat.

We watch the city docks and walls
And keep them spick and span;
Maintain the public buildings;
We're busy—to a man.

We oil and sand the dusty roads,
Junk autos small and large;
When tenants, broke, can't pay their rent,
We move them free of charge.

We shovel snow and chop the ice
When winter blows its blast;
We'll fight our way through any job
And battle to the last.

The whole department's moving,
Among us are no shirks;
We're a hustling crowd, and ask out loud,
Give praise to the Public Works.

WILLIAM F. O'CONNOR,
Cost Recorder, Public Works Department,
Troy, N. Y.

TWO-WHEELED DUMP CART OF 1½-YARDS CAPACITY—EARLIEST TYPE OF VEHICLE FOR REFUSE COLLECTION IN TORONTO

THE STANDARD TYPE OF MOTOR TRUCK WITH 6-YARD BODY NOW USED FOR REFUSE COLLECTION IN TORONTO

3 Important POLICE RADIO FEATURES offered by GAMEWELL

1 **Gamewell is prepared to furnish radio transmitting equipment for *municipal*, *county* or *state* police requirements.**

2 **Gamewell-Westinghouse offers the only complete line of radio transmitting equipment designed to meet the special requirements of police work.**

3 **Gamewell is the only company in a position to handle your police radio problem completely and without divided responsibility: (1) *survey*, (2) *sale*, (3) *installation*, (4) *service*.**

For Cities, Counties or States
ABOVE 100,000 POPULATION

Gamewell-Westinghouse Type "CQ" Radio Alarm Transmitter

Designed exclusively for police radio alarm service—100-watt unit will serve cities of more than 100,000 people—capacity up to 500 watts to take care of very large cities or counties. Exclusive unit feature makes it possible to increase power as city grows—starting with 500-watt transmitter, state police can enlarge up to 5-KW without discarding, by adding amplifying equipment.

For Cities
UNDER 100,000 POPULATION

Gamewell-Westinghouse Type "EB" Radio Alarm Transmitter

Only 50-watt transmitter on market designed exclusively for police radio alarm service. "EB" Transmitter gives all features of larger units to cities with limited appropriation having less than 100,000 population. Where city is growing rapidly "CQ" Transmitter may be installed and operated down to 50 watts to comply with Federal Radio Commission Regulations, until city exceeds 100,000 mark.

MUNICIPAL, county or state—no matter what your police signaling requirements are, Gamewell is well able to serve you. No makeshift apparatus adapted from other fields—instead, rugged transmitting equipment specially designed for efficient police radio alarm service. This apparatus is built exclusively for us by Westinghouse, pioneer in radio broadcasting and the manufacture of radio transmitting equipment. It will outlast makeshift equipment and furnish more reliable operation.

Gamewell, pioneer in police signaling apparatus for municipalities, is better able to serve your police radio requirements from start to finish. To deal with Gamewell means that you deal with just one reliable company—no divided responsibility to worry you from start to finish. Yes, we're the only company in the field that can make your *survey*, *sell* you the apparatus, *install* and *service* it—four important functions every police official should keep in mind when contracting for police radio alarm equipment.

And, Gamewell is the one company that can serve all of your police signaling requirements from street signal box and recall system to radio alarm apparatus. Write for our booklets R-783 and R-811.

THE GAMEWELL COMPANY
NEWTON, MASS.

GAMEWELL-WESTINGHOUSE POLICE RADIO

Fire – Police – Safety

BY P. STRUCKMEIR
Hadley Vocational School, St. Louis, Mo.

Aid for Fire Prevention Week

FIRE Prevention Week is October 7 to 13. Its sponsors are the National Board of Fire Underwriters, the National Fire Protection Association, the National Fire Waste Council, and the stock fire insurance companies. These organizations invite and urge all chambers of commerce, safety committees, and fire departments to organize local interest and action toward fire prevention and protection. A. Alfred Fleming, Chairman of the Fire Prevention and Clean-up Committee, National Fire Protection Association, is at 85 John Street, New York.

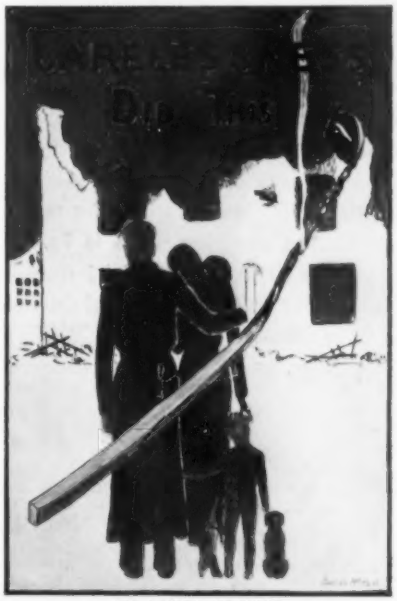
The activity in Fire Prevention Week is the result of interest on the part of five or six hundred communities. Later, the N.F.P.A. receives reports from some 300 organizations giving both the program that was followed and the results. The Association weighs these reports and selects the first and second in order of importance in each state, and also the third and fourth for honorable mention. From among these are selected the ten or twelve outstanding drives of the entire country. The organizations in all these 200 or more communities are awarded certificates of merit.

The N.F.P.A., 60 Batterymarch Street, Boston, and the National Board of Fire Underwriters, 85 John Street, New York, both issue a number of items of fire prevention literature for use in next month's campaigns. The Association supplies its material at cost, but will send free of charge to readers of THE AMERICAN CITY its 50-page Fire Prevention Handbook for the guidance of committees. The Board supplies its literature without cost in reasonable quantities.

Fire Prevention Week, anniversary of the Chicago fire of October 9, 1871, is for the purpose of concentrating attention on fire causes, presence of unnecessary combustible material, and alarm and extinguishing apparatus.

Fire Prevention Posters by University and Secondary School Students

IN its annual contest, which closed in time for exhibiting at the May convention, the National Fire Protection Association received 300 posters from grade-school and high-school children. The actual posters are 12 x 18 inches or more, and next year a definite size will be stipulated. The best fifteen, in the opinion of a board of judges appointed at the convention, were awarded prizes, the first three of $5 each. The two shown at left and right were not prize winners, but are representative. The one below is the official 1934 NFPA poster, not selected in this competition.



BY JAMES McKELL
Junior High School, Haverford Township, Pa.

BY BOWMAN MARTIN
Wichita University, Wichita, Kans.

New Cooperative Police Plan Proposed

A NEW proposal for a Federal-state-municipal cooperative police system, which has been made by Eugene E. Smith, a citizen of Portland, Ore., will be discussed at the convention of the International Association of Chiefs of Police in Washington, D. C., Sept. 24-27.

Commissioner of Police L. V. Jenkins of Portland, Ore., will present the plan, which is similar to the English police system. Under it the Federal Government would pay 50 per cent of the annual cost of any state police force and of any city force in cities over 10,000 population, provided:

1. The local police chief's qualifications are approved by the Federal Government.
2. The local police force meets certain minimum standards prescribed by the Federal Government.

These standards might set up specifications for numerical strength, prescribe adequate recruiting, training, promotion and retirement methods, departmental equipment, records and reports. These conditions, it is explained, would be accepted with the understanding that the Federal police power would not be extended. Municipalities and states would still control their police policies.

Quoted in the August issue of the Police Chiefs' News Letter, Police Chief H. D. Harper of Colorado Springs, Colo., says of the plan:

"There are many things to be said both for and against the proposal for Federal assistance to local police. It would have a tendency to continue efficient officers in their positions irrespective of political changes. It assures an adequate number of men and proper equipment. It would stop forever payless paydays and all their resulting evils. The plan is worthy of careful consideration by all police chiefs."

Motor Vehicle Deaths

JANUARY-JULY, inclusive

1934	**17,860**
1933	**15,020**
1932	**15,555**

(National Safety Council estimates)

Park and Street Maintenance

Long Beach, Calif.

It seems too bad to mar this beautiful setting by ripping up the street. But the job had to be done, preparatory to relaying . . . and the City of Long Beach finds its 48-hp. Allis-Chalmers Model "K" just the tractor for this heavy work. The operation seems to have attracted quite a gallery of youthful inspectors. Incidentally, the tropical effect of those palms is quite striking.

Torrance, Calif.

This city has more than 25 miles of streets and roads to keep in good shape. Shown here is its Model "K" tractor and Allis-Chalmers No. 10 grader . . . a combination which the city has found ideal for building and maintaining streets in the suburban districts. This picture shows the "K" and "10" grading streets and cleaning ditches in the village of Walteria, which is within the city limits of Torrance . . . making good streets better.

Fullerton, Calif.

Like its neighbor, Long Beach, the City of Fullerton has assigned the job of ripping up streets to an A-C Model "K". It takes power to rip up this hard-packed asphalt, but when it comes to power, the "K" has plenty . . . not only for this job but for many other types of city work.

◆

For Your City . . .

Most cities need a tractor that is flexible and economical enough to do both light and heavy work. The Allis-Chalmers Model "K" . . . which develops over 48 maximum horsepower . . . yet sells and operates in the price class of a 35-horsepower tractor . . . fits into that need perfectly. No wonder so many cities own and use Model "K's".

ALLIS-CHALMERS
TRACTOR DIVISION—MILWAUKEE, U. S. A.

SEPTEMBER, 1934

Vol. XLIX, No. 9

The American City

470 Fourth Avenue
New York

35 Cents, $2 a Year

THE AMERICAN CITY advocates:

An abundant supply of clear, safe, palatable water

Streets and roads that are well built, well lighted, well maintained

Sanitary disposal of sewage and garbage

Fire and police departments properly trained and equipped

Traffic control for safety and facilitation; fewer grade crossings

Plenty of parks, parkways, playgrounds, and swimming pools

Banishment of slums, and building of well-planned home neighborhoods

Administrative efficiency and citizenship co-operation in bringing these things to pass

The Lake Springfield Water-Supply and Power Project

By LEWIN E. GEORGE

A CIVIC dream founded upon an actual necessity is, after eleven years, coming true for residents of Abraham Lincoln's town, Springfield, Ill. In 1923, a survey showed that the future growth of the city depended upon a sufficient supply of good water. The flow of water at the Sangamon River pumping station was inadequate to supply the needs of a growing city. The survey indicated three sites where water could be impounded for an artificial lake.

Now, in spite of a spring drought, one of the most severe in the annals of the Government Weather Bureau, Springfield has its lake, a real body of water which, when even normal rainfall ensues, will be able to take care of the needs of a city of 300,000 population, furnish recreational

AIRPLANE VIEW OF THE MAIN DAM AND SPILLWAY OPENINGS, SPRINGFIELD, ILL.

When the lake is filled, the water will be 1¼ miles wide at this point

Photograph by courtesy of the Bloomington Pantagraph

VIEW OF FOX ROAD BRIDGE, SPRINGFIELD, LOOKING NORTHEAST
Seven-eighths completed on June 1, 1934

facilities and, in addition, supply water to several smaller municipalities within a radius of fifteen to twenty-five miles.

In 1928, The City Commission authorized the engineering firms of Burns & McDonnell, of Kansas City, and Pearse, Greeley & Hanson, of Chicago, to make surveys of various sites available for the impounding reservoir. Each firm was allowed $3,000 for the survey. Both recommended the site on Sugar Creek, which runs south and east of the city, through a rolling, wooded territory abounding in great natural scenic beauty, with the site for the main dam about 3½ miles from the business section of the city. Both engineering firms estimated that the lake project would cost approximately $2,700,000.

Financing

In approaching an undertaking of such magnitude and importance, the sponsors of the lake kept eyes open for the best financing plan. Before the question of issuing bonds was proposed, the City Commissioners gave assurance in various public statements that not more than one-half the cost of the project would be met by taxation. A graphic chart was prepared forecasting the gross and net income of the water works for the twenty-year period the bonds were to run. After three years of the depression, the net revenue for 1933 was equal to the estimate. It now appears that the surplus earnings of the water works will pay about two-thirds of the total, and the electric light and power a substantial sum, leaving a very small part, if any, to be paid from general taxes.

Voters approved a bond issue of $2,500,000 on June 24, 1930, and the first million dollars in bonds was offered for sale in January of the following year. The credit standing of the city was evidenced when Eldredge & Co., of New York, bid in the offering for $1,043,000, plus accrued interest.

The remainder of the bond issue was sold, in September, 1932, to the Guaranty Trust Co., of New York, for $1,550,000 and interest, or a total premium of $93,000, plus interest, for the entire issue.

Some assistance was asked from the Federal Government last year, to complete additional improvements. A loan of $1,385,000 was obtained under the PWA program. This loan was secured by water revenue bonds. Recently, $400,000 of these bonds were released by the Government and sold to a private firm, netting the city a premium of $4,000, plus interest. Proceeds of the loan were used in the construction of the pumping station, power plant and water mains, and soon additional contracts will be let for a filtration plant, clear well and other necessary appurtenances.

Land Acquired

One hundred and eleven tracts of land in the lake area were appraised by four appraisers, and the city offered the landowners an average purchase price, plus a premium of 25 per cent. The owners of the land were approached in friendly manner, and condemnation suits, with the exception of three, were of a friendly nature; 8,457 acres were purchased at an average cost of $109.06 per acre, which included all improvements and severance damages.

The city's ownership extends from a few hundred feet to one-half mile back from the shore line. Control of this marginal land was one of the major problems anticipated and solved, successfully. A bill was passed by the Illinois Legislature providing for this contingency, and thus Springfield has absolute control over its lake shore line. This is particularly advantageous in the matter of controlling sewage disposal, and squatters on the lake land, and it will guarantee that shacks and temporary buildings will not be erected along the shore line. The shore land will be used for parks and drives, and such portions as are not needed will be leased for a period of sixty years, providing a sure source of revenue.

The lake basin was cleared of timber by local labor, with consideration given to those who were jobless and with dependents. All trees were cut off even with the ground, all stumps that were within ten feet of the water level were blasted out, and all brush was burned or removed. Abandoned farm houses in the lake basin were moved to the higher shore land and rehabilitated, and many of them have been leased and occupied. Seven miles of sewers, draining away from the lake, and twelve miles of water mains, have been laid in the lake area. Already electrical energy is being supplied to most of the area. Many permanent homes are under construction.

A recreation center of seventy acres, near the public bathing beach, is being laid out to provide baseball diamonds, tennis courts and other outdoor sport facilities. The bathhouse, under construction, will accommodate 1,000 people, fronting on a unique beach. The beach is about 1,000 feet long, and is separated from the main body of the lake by sheet piling. Water is pumped from another portion of the lake, passes through a chlorinating plant, and is forced up through the sand of the beach. Impurities flow into the lake from the bathing area through openings in the piling wall.

THE COMPLETED SOUTH SIXTH STREET BRIDGE ON U. S. HIGHWAY 66 IS 1,600 FEET LONG

A 24-inch main from the lake site to the regular city water supply brings water from the old Sangamon River pumping station to the lake, awaiting the completion of the new pumping station and power plant at the lake, some time next fall. Although a filtration plant will be a part of the new equipment, chemists assert that the new lake will contain remarkably pure water, with its supply from clean agricultural areas and with all lake area sewage taken away from the territory.

The Dam and Highway Bridges

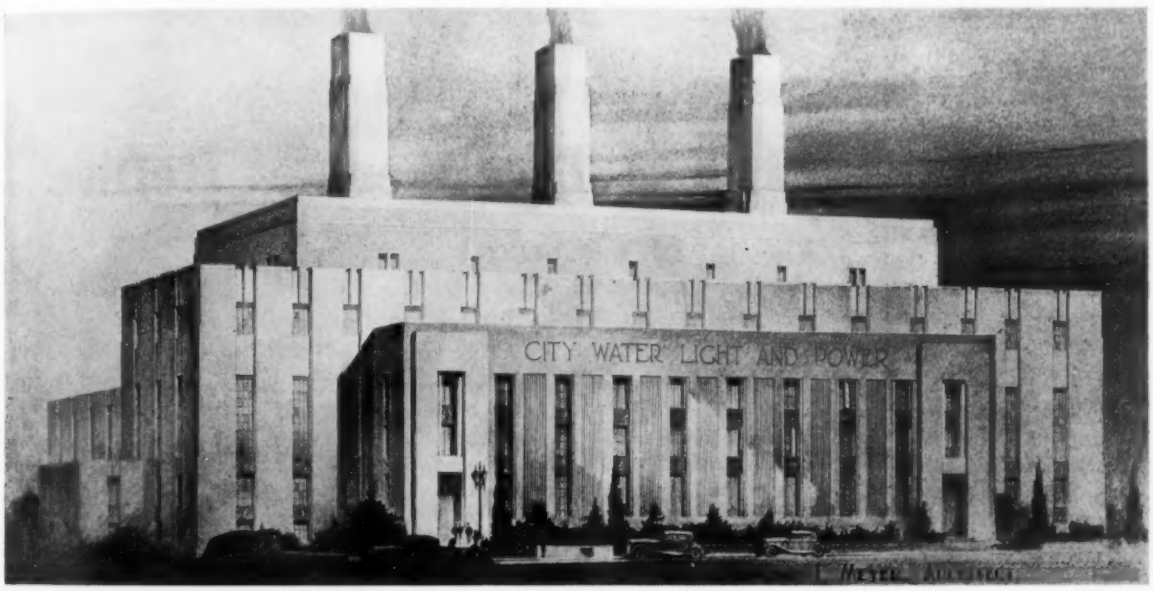
Three main projects for which contracts were let at the start were the main dam, the Fox Road bridge, and the South Sixth Street bridge.

The dam is 1,700 feet long. Sheet piling was driven to rock or shale, and on top of the piling a concrete core wall was built to the proposed high-water lake level. The dam itself is of earth, 300 feet wide at the bottom and 50 feet wide at the top. A concrete roadway crosses on top of the dam and connects with a hard-surfaced road at either end. The bridge approaches are ornamental and imposing. On the west end of the dam is the spillway, consisting of five automatically controlled flood-gates that will control eight feet of the lake level. The gates fall as the water rises, and rise as the water falls. A concrete retaining wall leads into the spillway, and the basin in front of the gates is provided with a concrete floor to guard against washing. Staggered riprapping of stone has been provided for the water side of the dam, and scientific riprapping has also been employed at many other points on the shore line to circumvent wave action. The cost of the dam was $488,000.

The Fox Road bridge is 1,400 feet long and crosses the lake at a bottle-neck between two of the largest basins. It leads to the recreation center. High arched construction provides for eleven spans, the center, 100 feet long and 54 feet high, with a clearance of 29 feet above water level. Adjoining spans are sucessively 3 feet shorter and connect with the approaches. A room in one of the west spans has been built for an electrical substation, and the chlorinating or water treatment plant for the bathing beach will be in one of the east spans, above water level. The bridge contract called for an expenditure of $190,000.

Second only in length to the main dam is the South Sixth Street bridge, on Federal Route 66, the main highway between Chicago and St. Louis. It is completed and has been in use for some time. The cost was $194,000. It contains forty-three spans and is 40 feet wide, allowing for four-lane traffic and pedestrian lanes. This bridge crosses the lake basin at a particularly scenic point.

When sufficient rainfall ensues, 4,200 acres will be flooded to an average depth of 15.3 feet. The reservoir will contain 21 billion gallons of water. The lake is, roughly, oyster-shaped, with numerous sloughs and inlets leading in from the small creek sources. The approximate length is 15 miles, with a shore line of 35 miles. The maximum width of the larger basins is 1½ miles. Many of the scenic drives around the lake have already been improved and are in constant use, but the completion of this phase of the work will take considerable time.



THE NEW CITY WATER, LIGHT AND POWER PLANT UNDER CONSTRUCTION, SPRINGFIELD, ILL.
Situated on high ground on the lake premises, near the main dam

Tree Nursery Established

As an example of the forward-looking attitude of those in charge of the lake project, the city established a nursery, in charge of a qualified forester, for the purpose of reforesting barren areas around the lake shore. This has a twofold pupose—to prevent erosion and to beautify the marginal land. Some areas, where the prevention of erosion is the principal need, will be planted closely with conifers, such as pine, fir and spruce. Other areas, for recreational purposes, or for homes and cottages, will be planted mostly with hardwoods. There is some objection to the hardwoods close to the water, on account of the taste given by the falling leaves from deciduous trees. The shore line will also be dotted with clusters of flowering crab, adopted as Springfield's native tree, and such

other flowering trees as are adapted to the locality, to give a dash of color. This reforesting plan started two years ago, and more than a half-million trees have been planted and this work will continue for the next eight or ten years.

The New Power and Pumping Plants

Springfield, through the keen competition of its municipal power plant with the privately owned utility, enjoys the lowest electric light and power rates of any city in Illinois. The city has consistently lived within its income, and its enviable financial standing is evidenced by the premium paid for its bonds.

Contracts have been let for much of the equipment for the new power and pumping plant and, when this was written, additional contracts were soon to be let for all remaining equipment. The equipment for which bids have been approved and contracts let is as follows:

Turbo generator—General Electric Co., 10,000-kwh, 12,500-kva, 13,800-volt, 3,600 rpm.

Steam generating unit—Springfield Boiler & Mfg. Co., straight tube boiler, 100,000 pounds of steam per hour, 415 pounds gage pressure, 750 degrees super-heat, 320 degrees feed water.

Forced and induced draft fans—American Blower Co.

Air pre-heater—The Air Pre-Heater Corp. (Ljungstrom).

Super-heater, inter-deck type—Foster Wheeler Co.

Pulverizer, feeders and burners—Riley Stoker Corp.

Boiler setting—Sigelow Liptak Corp.

Soot blower—Bayer Soot Blower Corp.

Ash-sluicing system—Allen Sherman Hoff Co.

Condenser (160,000 sq. ft.)—C. H. Wheeler Co.

Heaters, evaporators, drip coolers, motors on all auxiliary equipment; switchboards, motor controls; switch gear; exciter—Westinghouse Elec. & Mfg. Co.

De-aerating heaters—Cochrane Corp.

Boiler-feed pumps, ash-sluicing water pumps, condensing circulating water pumps, Allis-Chalmers Mfg. Co.

Coal-conveying system—Robins Conveying Belt Co.

Station transformers and house transformers—Maloney Elec. Co.

Intake water screens—Link Belt Co.

Building cranes—Whiting Corp.

Coal crusher—American Pulverizing Co.

Coal scales—Richardson Scale Co.

The engineering firm of Burns & McDonnell, of Kansas City, was awarded the general supervisory contract for the lake construction.

Public Cooperation in the House Treatment of Refuse

By **H. B. BLECK**

City Engineer,
Waukegan, Ill.

PUBLIC approval of any municipal enterprise is dependent on its economy of cost, its reliability and excellence of service, and its recognition as a civic necessity. Too frequently the fate of a municipal service is decided on cost alone. Seldom are community health and sanitation accorded their merited importance. Seldom are the temporary benefits of tax reductions compared with the inevitable after-results of increased social loss. Street lights have been dangerously dimmed, only to result in an increase in crime and traffic accidents; pavement surfaces have been made dangerous by neglect of maintenance; in some instances, municipal refuse collection has been abandoned to the benefit of the privately managed, more expensive scavenger combinations—all of this allegedly to save the taxpayers' money.

A year ago the city of Waukegan took over the task of refuse collection, replacing an incomplete and unsatisfactory service under private management. Fourteen scavengers and fourteen scavengers' rigs were released and an $80,000 a year business was disbanded in favor of five municipally owned and operated modern refuse collection units. The public permitted the change to be made primarily because each householder foresaw a possible saving of $12 to $15 per year, notwithstanding the fact that every portion of the 9⅞ square-mile municipal area was rapidly being converted into an open garbage dump by the many families who, in the recent times of poverty and deprivation, could no longer pay the private scavenger $1.25 to $1.50 a month.

Waukegan is an industrial community of 33,500 inhabitants with a substantial development of modest, but well-kept, homes. The first year of refuse disposal under municipal management resulted in an approximate 70 per cent reduction in cost. Including depreciation, the total expenditure did not exceed $24,500. From an annual charge per family of $15 to $18, the cost has been reduced to about $3. At the same time the service has been extended to 97 per cent of the households.

Tax Limitations Restrict Service

Statutory tax limitations made it impossible to include the removal of commercial garbage and the refuse accumulations at industrial and business establishments. For similar reasons, the city could not build an incinerator and institute a separate collection service for garbage and ashes. Although admittedly not the most sanitary method, the city conducts a mixed collection service with disposal by land filling. The site is on marshy ground, rather remote from residential areas. Covering the dump with earth or cinders is not always performed as faithfully as might be desired for adequate sanitation. The land-fill method, however, with one collection system, is the least expensive, and it made possible a maximum service at minimum cost. The apparent saving of well over $50,000 per year, under municipal management, was probably the greatest factor in getting public acceptance and endorsement.

Persuasive Methods Important

Public cooperation in the house treatment of refuse is an evolutionary process. At the beginning, latitude must be extended. Consideration of general economic conditions must be given, particularly with respect to the kind

and the structural condition of refuse receptacles; allowances must be made and many offenses minimized or overlooked entirely. A great number of violations can be corrected with far more satisfactory results by persuasive methods and direct appeal to civic pride than by force or intimidation. Although fines and penalties are generally provided in city ordinances, it should rarely, if ever, be necessary to invoke the law.

The public, too, should be considerate. The job of refuse collector is a filthy occupation and the people should be willing to do their part in making collection less odious.

Methods to Be Considered

If definite revenue limitations exist, the service should be planned to fit the budget, as nearly as practicable, with provision for the addition of other desired features as and when funds can be made available. In working out a plan, it is necessary to ascertain and consider methods, costs, etc., for each of the component parts of the problems, as follows:

1. Determination of the kinds of refuse to be collected, their quantities and the frequency of their removal.
2. Method and cost of disposal.
3. Manner and cost of transportation of loads collected to point of disposal.
4. The collection and its cost, concerned with the vehicles, their number, character, motive power, accessories and personnel. The daily refuse load should be calculated and a district and route map prepared. The route map should definitely set forth the course of travel for each collection unit.
5. The house treatment of refuse, including the preparation and separation of the material to be handled, the type of containers, and the location from which collections are to be made.
6. Records, forms and cost keeping. These include: (a) kitchen card or department rules; (b) complaint form; (c) notice of violation; (d) daily and monthly progress record; (e) monthly and annual cost record for the fleet and for each unit, showing the major cost items as well as the amount of work done.
7. Incinerator and/or dump costs and records.
8. Administrative, clerical and inspection personnel, and their costs.

The Plans Must Be Understandable

Having correctly planned the project with reasonable certainty of its financial success and with the assurance that collections will be effectively and regularly made, the city is then in a position to invite and to expect public cooperation in the house treatment of refuse.

The customers of the service should be given reasonable advance information to make their assistance possible. The why and wherefore of the regulations should be well understood. The local press, in publishing a series of short, well-written articles on the subject, is of inestimable value as an educational medium. Opportunities to present the subject to the various civic clubs, women's clubs and the like, should not be overlooked. Every invitation to discuss and explain the project should be accepted. These contacts, incidentally, will result in many practical suggestions for improvement.

In Waukegan, the date of the beginning of the municipal service was announced by an advertisement in the local newspaper, the first publication being about one month prior to the date of beginning. This gave the householders ample time to terminate their service agreements with the private scavengers. Under the ordinance, the scavengers were permitted to continue in business. No attempt was made to legislate them out of existence. With the gradual conversion of the skeptical element of the citizenry to municipal service, the desired result of eliminating private scavenging was accomplished as a natural consequence. The published notice described, in general, the procedure adopted by the city, the location and type of the receptacles required and the scope of operation.

Window Cards Displayed

One week prior to beginning the service, the collection personnel was hired and instructed in their duties. These were summarized in a mimeographed statement. In addition, each driver was given his route map. Each collection unit was supplied with a stock of "window" or small cards. The days of collection were stamped on the face of the card, and the cards were delivered to all the households in each district, in the order of the daily routing. The regulations provided for the placing of the card in a prominent window each time refuse collection was desired by the housewife. We enjoyed a greater display of the yellow cards than all the combined efforts of the NRA posters and "Go to Church on Sunday" movements. Needless to say, a deluge of protests followed. In only one respect were the cards a success. They established the homes desiring city service. We no longer insist on the display of the card.

The reverse side of the window card was given over to the rules and regulations of the Department. In general, these were patterned after the requirements of any well-regulated American city. Aside from their being somewhat lengthy and all-inclusive, one other mistake was made. The most important item was placed last instead of first. The closing section contains the following plea, "Help clean up Waukegan and Keep It Clean." Instead of being written up as a section of the regulations, this might have been expanded into a dignified preamble in which a strong appeal was made for cooperation and incidentally an effort to point out the actual benefits to the householder which would be derived through close conformity with the regulations.

The rules and regulations, or "kitchen card," should contain and briefly explain the items and requirements as follows:

(1) A plea for public cooperation and the mutual benefits derived by conformity with the rules; (2) schedule of collections; (3) location for refuse containers; (4) number, size and type of receptacles required; (5) house treatment of garbage and other refuse; (6) general information relating to materials included and excluded from municipal service; instructions for reporting dead animals, information relative to making complaints and reporting violations, and the general conduct required of the collectors in relation to the customers.

Garbage left in containers longer than three or four days between collection periods in warm weather is apt to putrefy and result in insanitary and distinctly odorous home conditions. Further, garbage should not be allowed to accumulate to such an extent that the table refuse from the average family will require more than one receptacle.

The size of the can should be limited to a content of not less than 20 gallons nor more than 30 gallons. The use of a multiplicity of undersized containers for one family should be discouraged. Whether collections are to be made daily, three times a week, twice a week or weekly is therefore determinable from the foregoing factors, namely, sanitation, daily refuse quantities, and cost.

Location of Waste Containers

Considering the convenience of the customers, the desired location of waste containers is as follows: (1) garbage container at the rear door or rear of lot; (2) ashes from the basement of homes; (3) rubbish from the basement of homes. Adoption of these locations will result in an expensive service. If basement collection is requested, such service should be rendered only on condition that an additional charge can be made to those who desire it and are willing to pay the extra cost.

There were long and loud protests against extra charges for basement service. Experience in Waukegan has been that the number of people who are ready to spend an additional 50 cents a month for carrying out ashes and rubbish is very small indeed. Fifty cents is fifty cents after all, and when the householder can see where it can be saved, save it he will.

The location designated for refuse receptacles also determines the number of pick-ups which can be made by the collector and thereby fixes the relative economy or expense of the collection service. The curb or parkway location is the most economical, although there are a number of good objections, particularly unsightliness. Excluding the time required for route travel or the forward movement of the collection unit, which with a two-man, motorized vehicle approximates a rate of 5 miles per hour, the number of pick-ups which can be made per collector per hour varies with the location designated for receptacles as follows:

Location of Receptacles	Pick-ups for Collector per Hour
1. Curb or alley	90 to 120
2. Front of houses (20 to 30 feet from street line)	70 to 85
3. Rear of houses	40 to 60
4. Basements	15 to 25

The location to be adopted is therefore determinable from the standpoint of revenues available and the convenience demanded by customers.

The Garbage Parcel

The proper treatment of refuse in the kitchen is an important item in which the public in general will cooperate willingly in all reasonable regulations. The majority of housewives find it no hardship to drain and wrap the garbage in paper. They realized that odors are minimized, that the garbage cans stay cleaner and last longer, and that paper wrapping is distinctly more sanitary than the old swill-pail method.

The suggestion made by the collection officials in Waukegan that garbage parcels be compactly tied was not received with any spirit of cordiality. It provoked many an unkind word, witticism and sarcastic remark. It was considered to be a fairly reasonable request because the practice had previously been quite common under the old methods of refuse disposal. There existed an organized club of "night-riding garbage tossers" who respected neither neighborhood nor property in their final disposal of house wastes. These garbage bundles were always tied.

The recommended generous use of paper in wrapping garbage to reduce incinerator fuel requirements is somewhat superfluous. Whoever in the household is assigned the task of carrying out the kitchen waste, be it daughter, son or father, will attend to the item of paper sufficiency.

ACKNOWLEDGMENT.—From a paper presented before the International Association of Public Works Officials.

Land Condemnation for Low-Cost Housing Declared Constitutional

IN a decision which strongly fortifies the Federal Government's low-cost housing land purchasing and upholds its constitutionality, Judge Samuel H. West, of the United States District Court at Cleveland, Ohio, has ruled that the acquisition of land for a low-cost housing project is acquisition for a public use. The decision was handed down when Judge West overruled a motion filed by property owners to dismiss condemnation proceedings brought by the Government against the site selected for the Cendar-Central housing project at Cleveland.

The Cleveland project is one of more than 30 housing projects now under consideration by PWA's Housing Division. It is part of the nation-wide program to wipe out slums and erect low-cost housing under PWA. Around $125,000,000 has been budgeted for the program, marking the first time low-cost housing has been introduced on a wide scale in the United States, as well as providing employment and material orders in accordance with PWA's underlying aims.

The Cleveland property owners' motion contended that the Government, in acquiring land for a housing project, was not acquiring land for a public use and purpose and therefore had no right to condemn. Judge West overruled the motion, and in his opinion declared in part:

"I think that the testimony shows that the property is being taken for a public use, especially in view of the declaration of our Congress in the Act itself, and what evidence we have heard here from the witness stand supports the congressional declaration. There is no distinct challenge of the law upon constitutional grounds found either in the motion or in the answer, and I decline to hold that the law is unconstitutional even if it is intended to raise the constitutional question. There may be some doubt as to the constitutionality of this law,—no doubt there is a question,—but if that question were made and presented here it would not have been shown to the entire satisfaction of the Court that the law is unconstitutional, and I would therefore have so ruled."

After citing a previous case in support of his ruling, Judge West continued: "There is nothing to indicate here that the direct object of the law and the proceedings that are being taken under it at the instance of the President is a private benefit to individuals. The whole purpose, although it is somewhat indirectly accomplished, is a public purpose in my judgment."

The decision was characterized by Colonel Horatio B. Hackett, Director of Housing, as the most important to be handed down on PWA's housing program. "It means that now we have have a formal court opinion to back us in our right to acquire property for low-cost housing," he said. "We are free to go ahead on the program, knowing that our process of land acquisition has a firm foundation in law."

Twenty-Five Years of THE AMERICAN CITY—and of American Cities

Planning—Building—Operation—Maintenance—Improvement

THE AMERICAN CITY is twenty-five years old this month. During this exciting period of its life, which has witnessed the most profound upheaval in human affairs since the fall of the Roman Empire, it has endeavored painstakingly to record and energetically to lead a quarter-century of solid municipal and civic progress.

IN the physical process of conducting a governmental unit successfully there are a number of distinct though closely related forces, not one of which is sufficient in itself, and no minority of which will make a city go.

First there is the aspiration to provide better physical facilities for the people, so that they may live healthier, happier lives. The list that has appeared frequently at the masthead of THE AMERICAN CITY, and which will be found on page 47 of this issue, outlines the ideals of the perfect city for which this magazine has especially striven.

This indeed has been the creed of the magazine almost since its founding. On page 167 of the September, 1910, issue, the first anniversary, Charles F. Mebus said: "The chief endeavors for municipal betterment which command the attention of the authorities and the people are town planning, greater park areas and playgrounds, better and cleaner streets, refuse collection and destruction, pure water supply and improved sanitary sewerage and sewage disposal."

But the horizons of all utopias constantly recede. If all these things had come to pass, the inadequacies of the old days would have been largely forgotten, and magnificent present facilities would be taken for granted and viewed in terms of new needs and new possibilities which the broader experience and greater sophistication of a new generation would certainly develop.

First, then, comes to municipal officials and civic leaders the vision of better things that could be provided.

The second stage is the guiding of these gropings and the shaping of these idealizations into plans that will work.

The third advance is made when the bond issue and the steam shovel translate the practical plan, which recognizes the physical layout of the city, costs and oppositions, into water supply, transportation systems, buildings, parks, traffic movements.

Many examples could be cited of these three steps in the carrying-out of a city's determination to rectify past mistakes and to avoid future costly rectifications, by arranging and rearranging the physical facilities so that business and social adjustments and contacts will be most direct, profitable and enjoyable.

The opening article in the first issue of THE AMERICAN CITY described the inspiring plan for further improving the National Capital. The special significance of this project is that it was boldly conceived and much of it actually carried through on a large scale in a comparatively short time. Many city plans are grand in conception but fail to enlist the public support essential to detailed accomplishment. Little pieces of them are performed at a time, but too often the entire working scheme never reaches efficient consummation.

Three significant and complex results of foreseeing better facilities, formulating the plans, and constructing the works and the processes are the operation, maintenance and improvement of the finished facilities. Their successful conduct measures the value and justifies the cost of the planning and building. The best machine inefficiently operated is a capital liability. Maintenance and operation, indeed, are among the biggest jobs in the world. Comparatively few people are engaged in the production and practicalization of new ideas and in the improvement of existing plant and procedure. Many are employed in keeping London Bridge from falling down and keeping traffic moving over it.

This field of visioning, planning and executing is the one in which THE AMERICAN CITY has worked for twenty-five years. It has urged the construction of municipal facilities where they did not exist, and the improvement of them where they did exist, and has reported the progress in every branch of public-works activity from the planning of a highway system and the cost of operating a water-treatment or a sewage-disposal plant to the latest economies in motor-truck operation and the collection and disposal of garbage.

THE AMERICAN CITY recognizes the needs of its numerous classes of readers both for specific technical information and for that information in terms of municipal practice. The mayor, city manager, municipal engineer, sanitation official and the others in public service must be informed as to present conditions and new ideas about the activities with which each is concerned. These men and their principal assistants are directly responsible for the provision of the right equipment and its successful operation. It is a very considerable advantage for them to receive in one journal information on all these subjects. From its beginning THE AMERICAN CITY has been a business-trade-technical-professional magazine for the staffs of all the departments that plan work, write specifications, let contracts and purchase equipment and materials for the municipalities of the entire United States.

In noting the progress that has been made in the last twenty-five years, it is well to remember that the ultimate objectives, as stated in the creed of THE AMERICAN CITY, have always been substantially the same. The advancement has been in the means and economies of providing the facilities named.

Remaking Cities

Two far-reaching crusades that have now largely become established government procedure had their rise or general acceptance during the life of this magazine. The first is the City Manager idea, which, imported from Germany, was initiated at Staunton, Va., in 1908. In September, 1911, before any city had combined the manager idea with the small council or commission form of government idea, Richard S. Childs in THE AMERICAN CITY discussed the whole scheme on the basis of a charter proposed for Lockport, N. Y. Although this charter failed of favorable action in the New York Legislature, other cities gave the plan consideration, civic organizations like the National Municipal League hailed it with approval, and the first actual adoption followed in 1912 in Sumter, S. C. Today more than 400 municipalities and half a dozen counties operate under the council-manager plan.

This crusade dealt with men and the remaking of the administrative structure. The second crusade dealt with the material aspects of the city. It has progressed in three divisions—city planning, zoning, housing. The idea of a better city is not new. It was old when Nineveh and Babylon were planned. But the increasing emphasis on business in recent years and the totally new intensity of traffic congestion caused by the automobile, and to a lesser extent by the skyscraper, produced a renaissance of the city-layout idea that quickly gathered the force of an original movement.

There is now more need than ever for practical planning, for here is one of the main project sources for laying out long-time public-works programs. PWA through the National Planning Board—now the National Resources Board—has surveyed the situation and finds it not too satisfactory. True, there are 739 known city planning boards where there were 185 in 1922. But 417 of them have no money at all, and only 60 have enough to function properly. Of the 84 county and regional boards, 20 are without funds and only 7 have more than $20,000.

But nation-wide stimulus to the planning movement is coming from the activities and funds of the National Resources Board, of which Charles W. Eliot, 2d, is Executive Officer. It is a significant fact that it was Mr. Eliot's eminent grandfather, then President of Harvard University, who contributed to the first issue of THE AMERICAN CITY an article entitled "The Indispensableness of City Planning."

Zoning is another activity that seems in need of further encouragement. Though 1,241 cities have adopted zoning ordinances, 930 of them were prepared more than ten years ago and few of them have been revised. Zoning and city planning frankly contemplate the best interests of the whole city, all the people. Housing, on the other hand, is more intricate than either of the other two, owing partly to the sociological aspect and also to the well-known real-estate, tax and income uncertainties.

"Housing remains a challenge that few cities have had the courage to face," declared the editor of this magazine just four years ago. Fundamentally, the difficulty is this: Is the object of housing and slum clearance (1) to provide better living quarters for the poor? (2) to improve health and reduce crime? (3) to provide new construction and employment and prime the business pump? All three, is the immediate answer.

And disappointingly slow though progress has been, there is much to hope from the Federal aid available through the Public Works Emergency Housing Corporation and the new Federal Housing Administration, aided and abetted by the recently organized National Public Housing Conference and National Association of Housing Officials.

Water

In August, 1911, THE AMERICAN CITY told how an overloaded steam plant was replaced by 1-mgd pumps driven by gas engines. Now, of course, nearly three-quarters of all pumping is done by centrifugal pumps of increasing efficiency, the larger pumps attaining 90 to 92 per cent, driven by steam turbine or sychronous motor.

The most important development in the last three or four years is a better understanding of the preparation of water for the filter; how to condition it so that it will coagulate and settle rapidly, using the lowest efficient chemical dose and thus reducing costs. The substitution of ferric salts or chlorinated copperas and lime in place of alum is a recent development.

In addition to a larger employment of mechanical filtration and further refinements in chlorination, aeration, dechlorination, and softening treatment, increasing use is being made of specific chemicals to eliminate taste and odor, such as activated carbon, ammonia, and potassium permanganate.

Sewage

The most significant advances in the last 25 years have been in the accumulation of knowledge regarding the effect and permissible degree of pollution resulting from domestic sewage and industrial wastes; on the occurrence of peak loads from variations in stream flow and strength of the waste; of the variable characteristics and behavior of sewage during treatment. The result of these comprehensive investigations is that plants constructed today are better suited to the conditions they are designed to meet and are less likely to become obsolete or inadequate, though new features are of course added as they are developed and needed.

Sewage treatment as now practiced removes as high as 90 per cent of the objectionable organic impurities, and should do this at a minimum cost in as small an area as possible. Some of the methods in common use are the Imhoff tank, trickling filters, the activated sludge process, the disposal of sludge by separate digestion, the revived interest in precipitation by chemicals, the development of vacuum filters and incinerators for sludge disposal, and the combining of chemical treatment with mechanical filtration. Any one or several of these processes may be used, depending on the degree of purification to be achieved.

In the development of equipment, better pumps for handling both sewage and sludge have been developed, and improvements are constantly being made to all mechanical appliances, such as devices for removing grit, sludge and scum; blowers, air diffusers, incinerators, mechanical aerators for activated sludge, vacuum filters. The rapid development and improvement of these devices is the outstanding feature in sewage practice today.

The value of having adequate sewage-disposal facilities is being increasingly recognized in Federal, state and municipal legislation intended to safeguard public health.

Garbage

Waste disposal was first mentioned in THE AMERICAN CITY in March, 1910, in the first of a comprehensive series of articles by William F. Morse depicting the art when it was deep in the contract, horse-drawn, dumping, hog-feeding, and reduction era. Since then the motor truck has been developed in many types that require standardization, and economic collection is now recognized as being a local problem different from the problems of other cities, whether American or European. This problem is studied in terms of cost per cubic yard, per ton, man-hour, vehicle-hour. It is a technical problem to be solved by experienced men, and the results criticized by health officials.

What can be done by experienced men is illustrated by four time-, labor-, and money-saving innovations which the New York City Department of Sanitation has just put into effect: (1) redistricting of the entire city, with 50 districts instead of 59; (2) full-loading of the 774 covered trucks, instead of 60 to 94 per cent loading; (3) utilization of motor-oil drums as refuse receptacles; (4) training schools for chauffeurs, greasers, and officers.

The elimination of the nine districts was made possible by the new method of loading the trucks to capacity, thereby cutting out 1,000 loads per week. The usual 15 to 17 cubic yards of refuse, loaded into the side

doors of the 7½-ton cover trucks, weighs 4½ tons, and ashes thus loaded weigh 7 tons. The new method, in effect July 15, is to load as much as possible through the side doors, then lock them and continue loading through the top. It has also been found practical to load entirely by the side doors, dumping the truck back from time to time, and continue loading through the forward side door. The number of trucks has already been reduced from 1,450 to 1,250, due entirely to the work of the covered trucks. The saving amounts to 1,000 loads × 52 weeks × 5 miles per load = 260,000 truck miles, and — 600 men have been released for street-cleaning.

The usual refuse receptacles cost $3 to $12 each. Cutting one of the welded heads out of an oil drum and painting the drum costs 10 cents. There are now 2,500 in use in the 64 pushcart and 10 wholesale markets of the city, and 10,000 will be provided.

The accepted method of disposal is by burning. The needs are for incinerators designed for longer life; for 24-hour operation, making possible a smaller capital investment and a lower fixed cost per ton; a plant kept clean, because cleanliness raises morale, induces better care and operation of equipment. Cost to build has been $1,000 to $1,500 per ton since 1930, compared with $600 to $1,200 in 1910-14. It is rumored that one of our largest cities is contemplating the installation of boilers in the incinerators which it proposes to build in the future, and that arrangements have been made for the sale of the power generated to the public service corporations.

Streets and Highways

"Of all the features of city planning," wrote John Nolen, September, 1910, "streets are the most important. They are the framework of the city."

When THE AMERICAN CITY was born, there were 2,200,000 miles of rural roads, of which 9 per cent was surfaced. Now there are 2,700,000 miles, 22 per cent with surfaces. Of the 206,000 miles of Federal-aid system, 14 per cent is unsurfaced and 40 per cent low-type. Of the 358,000 miles of state highways, 26 per cent is unsurfaced and 43 per cent is low-type. Thus there are 3,264,000 miles of roads in the entire country. As for streets, in Greater New York alone there are 5,251 miles of streets, 3,284 paved and 1,967 miles unpaved, and the total for the country is 1,250,000 miles.

The effect of the depression has been to concentrate attention on streets and roads as an avenue of employment; but the volume of construction is half that of other years.

City street work is largely a matter of resurfacing, and many of these pavements are still of the types that were laid when this magazine was born: wood pavement was 10 years old then; brick had been in use 28 years and was smooth, durable, reasonable in price, and easily repaired; sheet asphalt was 33 years old, smooth, good-looking, not too expensive, and popular then as now; bitulithic pavement had been used for eight years. How to resurface these successfully is told in the June, 1934, issue. They can be covered with the same material or with concrete when there are no subsurface structures. Manhattan uses sheet asphalt for ordinary traffic and granite block for heavy truck traffic.

Roadside improvement is a department of growing interest to highway engineers and the public. Like lighting, it is believed that it should be considered an element of highway design, construction and maintenance. The United States Bureau of Public Roads so conceived it in 1928, when an amendment of Federal-aid legislation included shade trees as a part of the improvement. In 1930 the Bureau required each state highway department to include in its program some projects requiring landscaping, and 0.5 per cent of the allotment must be used for this purpose. In 1934 it has published a well-illustrated 40-page "Roadside Improvement" monograph.

Lighting

Where street lighting used to be thought more or less necessary for convenience and desirable for town gaiety, it has now been sold as a powerful deterrent to crime and accidents. THE AMERICAN CITY formally recognized the importance of outdoor lighting, now a regular monthly feature, in May, 1910. This "spectacular or decorative street lighting" of twenty or thirty years ago is parodied on page 91 of the August, 1934, issue, though be sure to see "One of Denver's Well-Lighted Streets" on page 344 of October, 1912. The period was the dawn of modern lighting, when the magnetite and white flaming arcs were replacing the carbon arc, and the carbon filament was being crowded by tungsten.

The principles of present-day practice have been presented frequently in these pages. In the August, 1934, issue the fundamentals are reduced to a tabulation of actual mounting heights, spacing, lumens and lamps per standard, and horizontal foot-candles.

Ample equipment, as well as facts, is available to the illuminating engineer, including the interesting sodium-vapor and high-pressure mercury-vapor lamps, and photoelectric control by which visibility rather than kw hours is the first consideration. The immediate problem is financial stringency—yet, it is advertised, an expenditure of only $91,000,000 should reduce preventable night accidents by half and save the cities $2.70 per capita at a total operating cost of $2.50 per year instead of the present $1.20. This calculated saving is in money that would not be required for automobile and property repairs, death and disability, loss of time, hospital bills, insurance costs, and crime.

Traffic—Ground and Air

Twenty-five years ago there was no modern traffic problem, photographs of Fifth Avenue at Easter noon to the contrary. There were travel, street corners, and 312,000 motor vehicles in the country instead of the present 23,827,000. The character of the present problem is suggested by the fact that though there were 1 per cent fewer vehicles registered in 1933 than in 1932, deaths increased 5 per cent. The need for $2.50 to $5 street lighting, instead of $1.20 per capita, as now, simple uniform rules, clearly visible and perfectly understood traffic signals, and better legislation more effectively enforced, is obvious.

Highway building and traffic control in the air may become more intricate than on the ground. It will include the charting and analysis of lanes of various altitudes and widths, as is already done where traffic is dense, as between London and Paris. It requires the provision of an expensive ground system of auxiliary fields, lighting beacons and weather-reporting stations; and the cooperation of municipalities not only in the establishment of airports but also in a willingness to forego an airport when one is already available at an adjacent city.

Police and Fire Departments

The principal advance in police administration in the last 25 years has been in a greater freedom from political interference and in the development of a personnel trained in police service. The old idea at its best was to keep a sharp lookout for trouble, and after the fact to catch the trouble-makers. The new idea is to do exactly that; but also to go to the source of the trouble, the juvenile delinquent, and get him started growing upward instead of along the ground. This means properly training the teachers in public and parochial schools so that they may recognize delinquency, know the vital need for preventing and correcting it, and know the best-tested methods to pursue.

The outstanding innovation of the last few years is radio transmission of orders and their reception by cruising cars. Whereas the automobile was of far greater aid to violators than to the police, the radio is a definite boon to the police. Started in Detroit in March, 1922, twelve years ago, by 1932 it had been taken up by 50 cities of 32,585,000 population,

with 2,255 cars, and today more than 239 cities, including 83 cities operating experimentally on frequencies above 30,000 kilocycles, are using radio for this purpose. Nine states are now operating 27 radio stations in connection with state police activity. The success of this new weapon depends on getting the messages to the police immediately, which calls for an increasing measure of support by a public that can see the value of giving it.

The traffic division has gained steadily in numbers and in traffic training. Its job has changed from the giving of signals to one of watching the observance of automatic signals and anticipating jams in an ever denser traffic.

In September, 1911, the Fire Commissioner of New York City discussed in THE AMERICAN CITY plans for wholesale additions to the city's 150 pieces of motor apparatus. Savannah was the first city to motorize completely, in 1912; and motorization soon became a matter of course.

The regulations of the Federal Communications Commission make no provision for the use of radio for communication between fire department headquarters and land fire apparatus. One frequency is set aside for the use of all cities of the United States in two-way communication with fire boats. The cities of Boston and Detroit are operating communication systems of this nature. In view of the fact that the police department is usually interested in communications relative to major fires, many cities have installed receivers on their fire apparatus in order that the fire department may take advantage of communications transmitted primarily for police departments.

However excellent the mechanization, prevention remains the better part of fire fighting: enclosure of stair and elevator shafts; better control of arson. These, combined with lower commodity values, more settlements on a sound-value basis, and a drop in net fire insurance premium receipts to the company reporting the losses, amounting to 17 per cent in both 1932 and 1933, made the 1932 loss the lowest since 1919, with the 1933 much lower, and this year likely to be lowest of all.

Recreation

The public playground movement began with sand gardens in Berlin in 1885, immigrated to the United States in 1886, gathered impetus in 1898 when New York City playgrounds were taken over by the Board of Education. By 1909 there were playgrounds in 267 cities, and now in 1,036. To regular expenditures, which are 25 per cent below 1932 and 42 per cent below 1931, have been added six millions of emergency money, bringing the total for the year 1933 to $27,000,000, or only a million below 1932.

A survey of municipal park recreation areas in 1930, the most recent, showed an acre per 100 to 165 persons in cities up to 500,000, and per 400 persons in the million-population class. Per capita costs ranged from $1.10 for cities up to 100,000 population, to $2.89 for the million class. Sources of revenue for the total expenditures of $98,000,000 were: city appropriations, 39 per cent; special tax, 17; bond issues, 28; fees and charges, 5; other, 11 per cent.

Utilities

In 1909 there were 1,410 municipally owned electric plants —3,014 in 1922; 2,198 in 1927; 1,802 in 1932. In September, 1930, it was remarked in this magazine that probably too many public plants had been sold to private utilities for insufficient reasons. This trend was checked in 1933, and since then there has been more interest on the part of cities toward publicly owned stations and distribution systems. The reasons are: (1) PWA cooperation; (2) high private rates; (3) success of many of the municipal plants; (4) Tennessee Valley Authority's low wholesale rates to municipalities, and general policy. The number of municipally owned gas plants has remained about the same for the last four or five years: 44 manufactured and 34 natural.

Finance

Four years ago this magazine reported that perhaps greater advancement had taken place in municipal finance than in any other important phase of city administration, and summed up the telling differences between the new and the old conception of responsibility. These advances had crystallized in the department of finance, budgeting, methods of accounting and auditing, personnel management, centralized purchasing, assessment practice, and the issuance of bonds.

At that time there had not yet developed the two opposing forces born of the depression—financial stringency, and a pressing need for heavy sums for an unheard-of burden of relief. At a most serious juncture, in 1933, the Federal Government assumed responsibility for an unemployment situation that thereto had been weakly met by breadlines. Thus relieved in part, and with Federal bargains in money for local public works, the cities were enabled to resume more normal operation and also to plan and start construction on works that otherwise would have been long postponed.

What is the financial situation in terms of money? Studies of typical cities made by J. L. Jacobs & Co. indicate that expenditures for ordinary municipal purposes, exclusive of debt and relief costs, are likely to be slightly less than last year and 20 per cent below 1931. Debt costs have risen 6 per cent since 1931; from 26 per cent of total cost in that year to 30 per cent now. The solution for many cities has been refunding, and more vigorous collection of delinquent taxes. It is this situation, together with the fall in property values and income, that has placed limitations on local bond issues for public works and increased adoption of the pay-as-you-go plan.

Public Works and Unemployment Relief

This summary of a quarter-century of service and progress must not close without special mention of the advocacy by this magazine of a courageous program of public works expenditures by the Federal Government, as well as by the states and municipalities, during the current depression.

In the issue of November, 1929, immediately following the stock-market crash, THE AMERICAN CITY published an editorial headed "Let Municipal Improvements Go Forward!" the first paragraph of which read:

"The American people are facing a crisis which demands clear thinking and prompt action by all who spend, or advise in the spending of, public funds. A time of speculative setback is no time for curtailment of public works. On the contrary, a wise increase in such activities may prove to be the stabilizing force now needed to prevent too violent a rocking of the industrial boat."

This editorial antedated by some three weeks President Hoover's telegram to the forty-eight Governors, urging "energetic yet prudent" pursuit of public works by state and local governments.

Unfortunately, the following months witnessed much more prudence than energy in the carrying-out of the President's advice.

In December, 1930, when it became evident that state and local expenditures would not, or could not, be carried forward in sufficient volume to prime the economic pump, THE AMERICAN CITY advocated the then radical proposal of a Federal bond issue of a billion dollars or more for national and local public works.

Subsequent history is well known to our readers. The Federal Government has vastly increased its public works activities, both by direct expenditures and by loans and grants to local governments. If the job had been done on the present scale more promptly, the depression might now be a thing of the past. Under existing conditions a five-billion-dollar program of Federal construction, or financing of local construction, may be needed during 1935, as the alternative to continued unemployment, strikes and doles.

Progress in Collection of Garbage at Rochester

By JOHN V. LEWIS

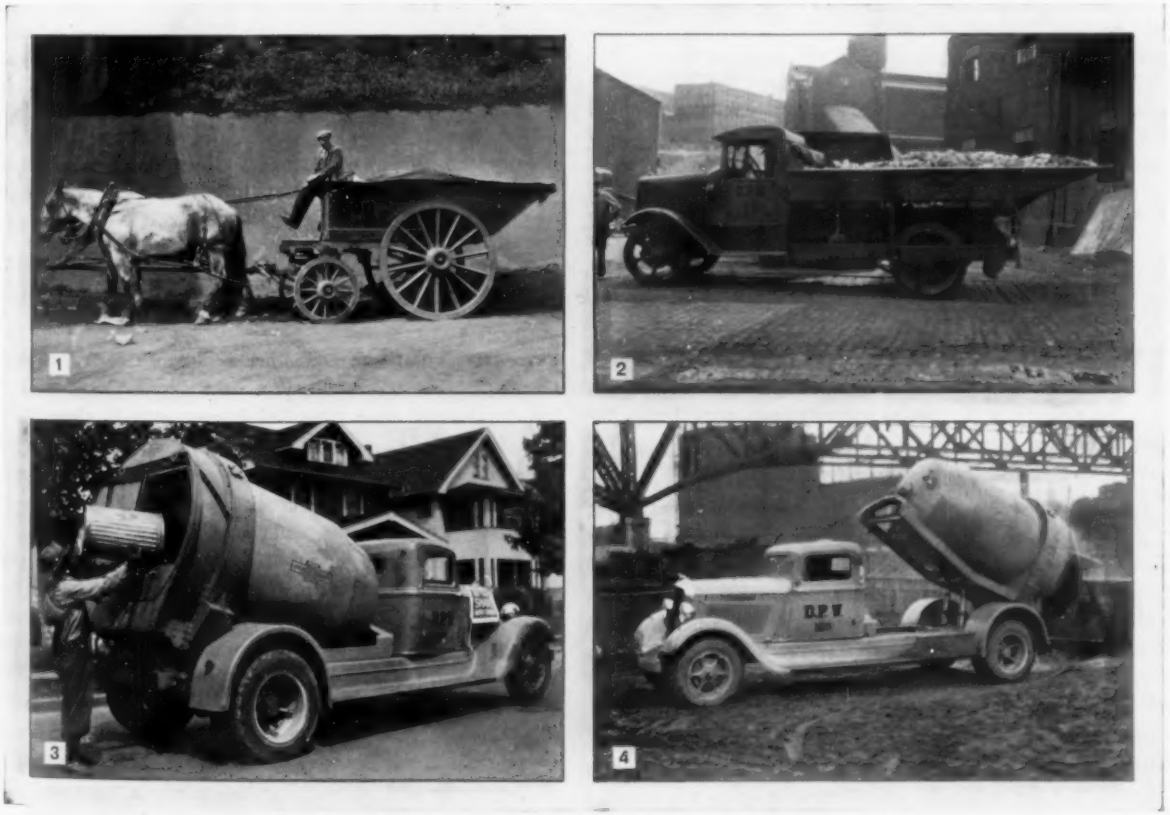
Director, Division of Maintenance and Operation, Department of Public Works, Rochester, N. Y.

THE city of Rochester has collected and disposed of its garbage as a municipal function for about 55 years. For more than the first 25 years of this period the collection was made by various individuals under contract to dispose of the waste material outside the city limits.

Available information indicates that the method of collection employed over the period of a quarter of a century was unsatisfactory. As a result of a comprehensive report made to the Mayor during September, 1906, by Edwin A. Fisher, then City Engineer, the city entered into a ten-year contract with the Genesee Reduction Co. to collect and treat the garbage in a reduction plant to be constructed within the city limits. The system employed was of the modified Arnold type, and its operation was carried out by the private company during the period from 1907 to 1916 and thereafter by the city until October, 1921, when the present straight "Cobwell system" plant began operation. Rochester is today one of the few municipalities which employ reduction as means of garbage disposal, and owing to conditions which are peculiar to the city this method will probably be continued for some years.

Disposal Method Determines Collection Method

Inasmuch as disposal by the reduction method requires the separation of garbage from other wastes and the elimination of paper wrappings and non-combustible materials, the method of transportation is most important if the col-



TYPES OF COLLECTION UNITS IN SERVICE IN ROCHESTER, N. Y.

1. One of the forty horse-drawn watertight steel body collection wagons still in service. 2. The standard 5-ton chassis with 5-cubic-yard steel dump body, twelve of which are still in service. 3. Loading the American-La France collection truck. 4. Method of unloading the newest collection truck

lection is to be carried out in a satisfactory and sanitary manner. In the early days of municipal administration collection was made first in barrels and later in wooden boxes transported on horse-drawn wagons. Such equipment was employed up to the time that the Genesee Reduction Co. commenced operation in 1907. That year marked the advent of watertight steel bodies mounted on horse-drawn wagons. Some forty of these units are still in service but will be displaced as rapidly as possible by modern auto truck equipment.

Ten years ago the city first purchased the standard 5-ton chassis upon which were mounted a watertight 5-cubic-yard steel dump body and an underbody hoist. The capacity is increased by the use of sideboards, which enable loads of 7 to 8 tons to be carried during the peak season in the late summer and early fall. A folding step is installed on the left side of the truck to facilitate loading. These units have given good service over the period mentioned, but in general their operation has been costly in comparison with more modern equipment. Also, while tarpaulins are provided to cover the load, there has been considerable verbal objection to the open type of body, which is conducive to conditions offensive to sight and smell. There are now about twelve of these units in service, mainly assigned to the more distant routes and daily collection service in the business district.

In view of these objections it was decided about one year ago to install an enclosed steel body manufactured by the American-La France and Foamite Industries, Inc., of Elmira, N. Y. This unit is mounted on a standard 2-ton truck chassis and has been in continuous use over a period of ten months. During this time an accurate record has been kept of its operation, and these data in comparison with the record of several of the older truck units are as follows:

In Table No. 1 capacity, weight, and average payload of the two types of auto truck equipment have been compiled. Experience has shown that the ordinary steel bodies and hoists employed in garbage collection service have a much longer life than that of the chassis upon which they are mounted. It is conceivable that this will also be true of the America-La France refuse body. Therefore, assuming that replacement of the chassis rather than the body and hoist will be necessary, the first cost of the 2-ton chassis is about one-third the cost of the 5-ton chassis. This smaller first cost more than offsets the higher depreciation which may occur with the 2-ton chassis because of the greater mileage covered.

TABLE NO. 1—DATA ON GARBAGE COLLECTION TRUCKS

Unit	Weight	Gross Capacity	Average Payload(*)
Standard 5-ton truck	13,500 lbs.	8.5 cu. yds.	5.0 tons
A-La F refuse collector	8,000 lbs.	5.5 cu. yds.	2.7 tons

(*)Period of 7 months.

The data given in this table do not mean that the American-La France collector is not capable of greater loading. In fact, loads varying from 3 to even 4 tons are not unusual, depending on the season of the year. The practice in Rochester is to collect only a definite route each day, and for this reason the tonnage is quite variable.

TABLE NO. 2—SUMMARY OF OPERATING COST

Truck No.	24	41	42	Avg.	129
Mileage	2,378	2,814	3.027	2,740	4,162
Tons collected	1,035	1,116	1,002	1,051	1,157
Labor	$2,364	$2,364	$2,364	$2,364	$2,364
Maintenance	412	599	423	478	311
Total cost	2,776	2,933	2.787	2,842	2,675
Cost per mile	1.17	1.05	0.92	1.05	0.64
Cost per ton	2.68	2.66	2.78	2.71	2.31
Maintenance per mile	0.17	0.21	0.14	0.17	0.07

Truck No. 129 is an American-LaFrance 6-yard, 2-ton refuse collector

These figures indicate a saving of about 40 cents per ton of garbage collected for the American- La France unit over the standard 5-ton units which have been used for a period of years.

The American-La France unit has been entirely free of mechanical and other troubles; it is the nearest approach to a closed body of any equipment now available; and it has occasioned much favorable comment in the high-class residential section where it is assigned. Without a doubt, this or a similar type of equipment will hereafter supersede the horse-drawn and open-body type of motor equipment now used in the city of Rochester for the collection of garbage.

A Middle Ground Needed in Tax Collection Policy

TAX delinquency is always prevalent, but it grows to major proportions in depression periods. The bank, the grocery, and other private creditors must be on the alert to enforce their claims. Meanwhile, tax collectors encounter a stout resistance.

No one in his social senses would advocate a harsh tax policy that would result in summarily dispossessing people of their homes or of real estate necessary for essential businesses. But at least it should be understood that real estate held without tax payment is in a very true sense held at public expense. The man in arrears for taxes does not hesitate to call the fire department if his home is burning; and the fire department must be maintained to protect his property, regardless of whether his taxes are paid or not. Likewise, he calls the police if marauders invade his premises or do him violence, and the police do not—cannot—stop to ask whether the petitioner has paid his taxes. He still drives over the very costly city streets and bridges; he does not hesitate to call the health department to remedy unsanitary conditions or to quarantine neighbors having dangerous communicable diseases; his garbage and other refuse are carted away, no questions being asked about his tax receipt. The grocery and the department store may find it necessary to close his accounts, but the city cannot possible cut off, in any such way, the services of a citizen whose taxes are unpaid. Indeed, when his income and his private credit are both exhausted, the city may have to feed, clothe, and house him,

The very preservation of life, property, and social order hang upon the maintenance of essential government functions. Somebody must pay the bill. The tax rate of those who pay taxes promptly is loaded and city services to them are curtailed, because of the failure of others to pay. Thus, he who does not pay promptly is drawing on the purses of others. If he is too poor to pay, he is for the time a burden on others. If he can pay but will not, he is needlessly a public charge and is, therefore, essentially a "sponger." Consequently, general laxity in tax collection is uneconomic and inequitable.

—From "The City Real Estate Tax in Pittsburgh," by J. P. WATSON, a recent monograph of the Bureau of Business Research of the University of Pittsburgh.

An Unorthodox Arrangement of Water-Works Units

By ROBERT B. MORSE
Chief Engineer, Washington Suburban Sanitary District

TO replace the existing water purification works at Burnt Mills, and to meet more adequately the demands of the Washington Suburban Sanitary District, the Commissioners of the District now have under construction new works which contain a number of novel features.

The existing works, consisting of temporary structures and presenting a heterogeneous appearance, were installed quickly more than ten years ago, to provide water for a rapidly expanding distribution system, pending the development of a permanent water supply. They have continued in use for a much longer period than originally intended, on account of the large expenditures required for the rapid installation of adequate water and sewerage systems, now containing 310 miles of water mains and 225 miles of sewers, which serve this extensive suburban section containing a population of not more than 65,000.

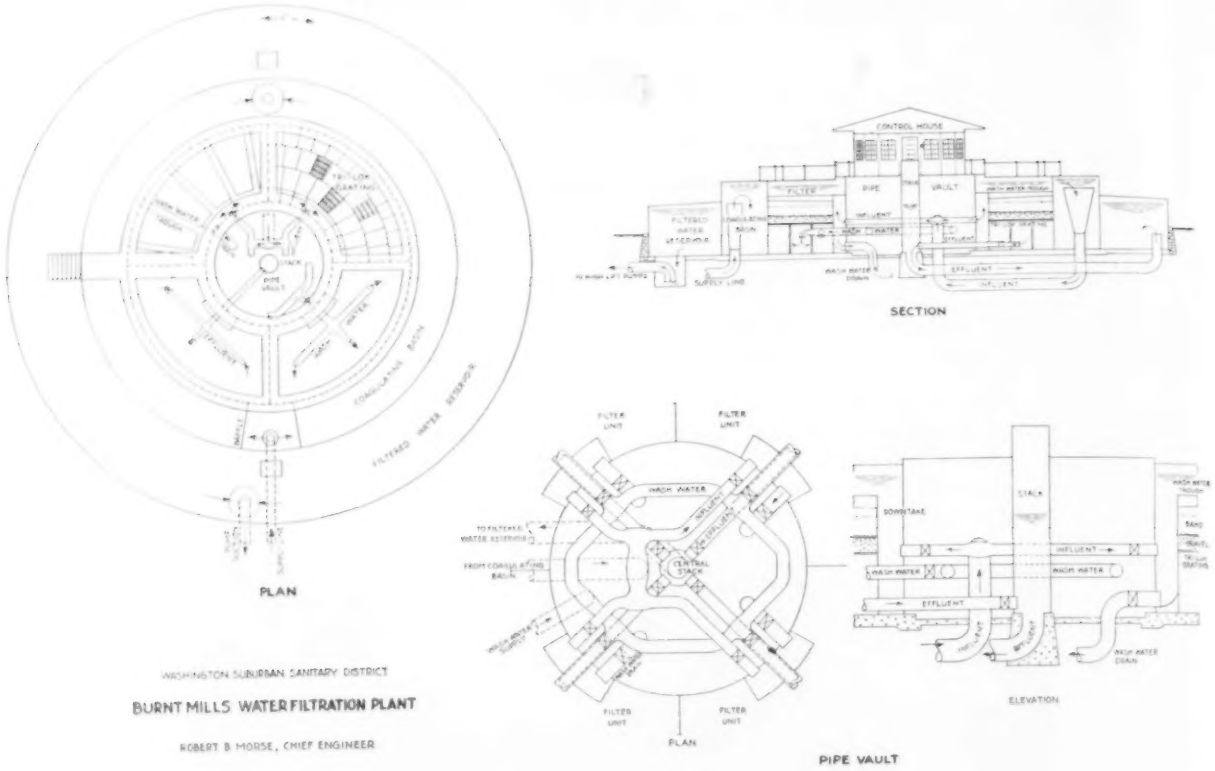
GENERAL VIEW OF THE 5,000,000-GALLON FILTER ASSEMBLY, SHOWING THE PRELIMINARY SEDIMENTATION BASIN IN THE BACKGROUND

Before its partial demolition, the old plant had a capacity of 4,000,000 gallons per 24 hours. The new works will have a nominal rating of 10,000,000 gallons and are expected to operate satisfactorily on a 25 per cent overload.

Briefly, the works will consist essentially of a main pipe line delivering water from the existing dam to aerators of the Aer-O-Mix type, whence it will flow through a preliminary sedimentation basin giving a period of about 3 hours, and thence to a low-lift pumping station having a total installed pumping capacity of 20 million gallons per 24 hours against a head of 12 feet. In this pumping station coagulating chemicals and activated carbon will be applied in the suction wells. They, as well as liquid chlorine, may be applied also to the raw water, when necessary, before its passage through the Aer-O-Mix machines. From the low-lift pumping station the treated water will pass to the coagulating basin, in which the nominal period will be about 55 minutes. No mixing basin has been provided. The course of the water thereafter will be as usual—through rapid sand filters, filtered-water reservoir, and thence to a high-lift pumping station. The total installed pumping capacity of this station will be approximately 24 million gallons per day against a head averaging about 275 feet. A pump of nearly 2 million gallons capacity, actuated by a hydraulic turbine through speed-increasing gears, is expected not so much to reduce the consumption of electrical energy as to aid gasoline engines in minimizing electrical maximum-demand charges and in emergencies.

The plans comprehend the construction of two 5-million-gallon-a-day assemblies, each consisting of a coagulating basin, four filters, pipe vault, filter-control house, and filtered water reservoir.

At the present time, one of these assemblies has been completed and will be operated temporarily through a gravity connection. In addition, the preliminary sedimentation basin, the foundations of the low-lift and hydro stations, and practically all the connecting piping, sewers, and drains have been finished.



Cylindrical Arrangement of Plant Units

A desire to secure the utmost economy in construction without, at the same time, jeopardizing successful operation actuated the writer to depart from conventions in designing the Burnt Mills works. The principal items meriting attention are the shape and arrangement of coagulating basin, filters, pipe vault and filtered-water reservoir; the filter bottom; the material of which the structures are made; electric heating for all buildings; and the uncovered condition of the filters.

Restrictions of space and configuration of the site called for the most compact arrangement possible. The writer had in mind the apparently unchallenged belief among engineers that the most compact and economical arrangement of filter-tank assemblies required rectangular units. Nevertheless, in checking up, he proved that cylindrical units permitted of at least equal compactness. This shape next appeared to have advantages for other constituents of a filter plant if certain difficulties could be eliminated. Then developed the conception of an arrangement under which the cylinders would be placed one within another, providing thus, through ring-shaped compartments, for the amount of space required by the several elements of the plant with the greatest degree of compactness.

In the Burnt Mills works, one 5,000,000-gallon-a-day assembly, consisting of pipe vault, filters, coagulating basin, and filtered-water reservoir, fills a circle having a diameter of 100 feet. A central cylinder having a diameter of 24 feet 6 inches contains the operating piping and valves. Outside this ring four filters, arranged in arcuate form, are bounded on the outside by a cylinder 54 feet 3 inches in diameter. Between this ring and one having a diameter of 72 feet lies the coagulating basin, outside of which, but within a 100-foot cylinder, the filtered-water reservoir is located. Topographical conditions prevented nesting of the preliminary sedimentation reservoir with the other basins, and consequently this was constructed at another point as a concrete rectangle 200 by 110 feet in plan. A preferred location would have been between the coagulating basin and filtered-water reservoir.

Appropriate piping connects the basins underneath their bottoms. All filters connect directly with a vertical stack in the center of the pipe vault, which in turn is connected with the filtered-water reservoir. Lime, liquid chlorine, and ammonia will be added to the filtered water. The control house, a building only 20 feet in diameter placed above the pipe vault, contains the operating stands and rate of flow gages.

All the cylindrical tanks, arranged concentrically, stand upon a concrete slab. The shells surrounding the filters and coagulating basin are 14 feet 6 inches in height, and the outside ring of the filtered-water reservoir is 10 feet high. This basin holds 275,000 gallons of water and is covered.

Filtered water is collected from, and wash water delivered to, the lower part of the filter tanks through separate piping systems, each having three major openings so as to produce favorable hydraulic conditions. The gravel bed lies on a flooring of Tri-Lok grating. This grating is composed of galvanized copper-bearing steel. The inner ends of the bars are slightly pinched so that the sections fit radially. A structural steel frame provides support for the grating.

The pipe vault, control house, filter tanks, coagulating basin, and filtered-water reservoir are constructed entirely of structural steel plates and shapes welded in place. Not-

able economy in both cost and space was thereby secured. All surfaces in the filter tanks not readily accessible after placement of the gravel and sand, and the outside of the filtered water reservoir below the finished ground level, were coated with bitumastic enamel. Cork-board lagging and ceiling protect the control house from extreme cold and heat.

All the buildings are to be heated by electricity. Estimates showed that this might be done at a total capital and operating expense as low as if oil heating were used. Electric current will cost ½-cent per kwh, and no increase in maximum demand charge will occur, since the maximum pumping demand is in the summer. The saving in installation cost is considerable by reason of the elimination of furnace rooms, chimneys, piping, and radiators.

Filters Are Uncovered

The uncovered condition of the filters constitutes an important feature by means of which a large saving in construction cost was made. The general arrangement used in this plant would be just as practicable, however, if the control house had been extended over the filters. The writer does not know of any uncovered rapid sand filters for all-the-year use in moderately cold climates except those at Burnt Mills. For the past six winters two filter units of 600,000 gallons daily capacity each have been operated there continuously in the open with little added labor cost and with highly satisfactory results. While most of the winters were much above normal and one was the warmest on record in this vicinity, two periods of real test occurred. In the winter season of 1929-1930 there were 153 days between October 5 and June 1 on which the recording thermometer at Burnt Mills fell to freezing point or below.

Methods of operating the filters during cold weather have been the subject of experimentation. Sometimes they were operated under an ice coating reaching a thickness as great as 8 inches, with no loss in efficiency. Ordinarily the ice was kept in a broken condition by the drop of water level during washing, and some of it passed off to the sewer. At other times the operators skimmed the ice from the surface as it formed, which required only infrequently

TEMPERATURES OF 1929-30 AND 1933-34 COMPARED

		1929-'30	1933-'34
No. of days with minimum temperature of	20° or lower	54	55
	15° " "	33	36
	10° " "	19	25
	5° " "	10	16
	0° " "	7	9
	−5° " "	3	4
	−10° " "	2	1
Minimum temperature		−11°	−14°
Average minimum for coldest consecutive period of	2 days	+ 9°	+ 9°
	3 "	−3.3°	−5.7°
	5 "	4.8°	−2.4°
	10 "	5.8°	1.1°
	15 "	6.0°	5.1°
	30 "	12.8°	6.8°
	32 "	.....	6.8°

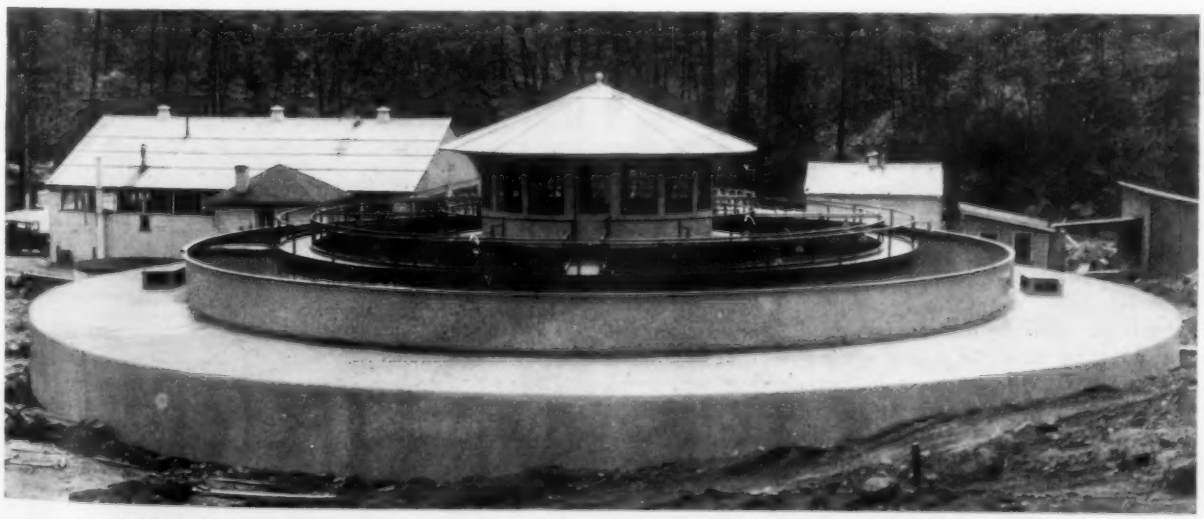
an appreciable amount of effort. Constant movement of the water during filtration, and especially violent agitation at times of washing, usually prevented troublesome ice formation at temperatures higher than from 10° to 15° above zero. At lower temperatures frequent opening of wash-water valves for a brief period, without drawing down the water level, gave good results.

The only serious difficulty encountered in the operation of open filters proved to be progressive freezing of the sand inwardly from the outside steel plating. This will be prevented in the new filter units, since they are surrounded by the water in the coagulating basin. Owing to the position of the filters in a ring around the control house, observation of the condition of the water will be almost as easy as in the ordinary plant. Specially designed underwater lights will aid at night.

The writer has made a comparison of temperature readings at Burnt Mills with those at many other places and he feels certain that even in many considerably more northerly locations open rapid sand filters may be operated at a great saving. Where too much extra labor might be expected, electrically operated heating devices may be installed, as is now the case where trouble from needle or anchor ice occurs.

Costs

At present it is impossible to state just what the cost of the completed project will be. The Commission's own construction forces are doing all the work except the steel erection. The Chicago Bridge and Iron Works furnished and erected the steel assembly consisting of pipe vault,



A NEAR VIEW OF THE 5,000,000-GALLON FILTER ASSEMBLY, CONTAINING THE PIPE VAULT, CONTROL HOUSE, FILTERS, COAGULATING BASIN AND FILTERED WATER RESERVOIR

A duplicate is to be erected beyond this unit. The existing plant seen in the background is to be removed

filter tanks, coagulating basin, filtered-water reservoir, and control house for the 5,000,000-gallon unit, including all influent and effluent devices of steel, filter-bottom supports, all walk-ways and railings, and the Euboeolith flooring, cork-board lagging and ceiling, doors, windows, and screens to complete the control house, everything unpainted, at a cost to the Commission of approximately $25,000. This equals $5,000 per million gallons of daily capacity. The cost of the Tri-Lok grating filter bottom amounted to about $400 per million-gallon capacity.

Had the site been more favorable, allowing a single 10,000,000-gallon nesting of preliminary sedimentation and coagulating basins, filters, and filtered-water reservoir, also only one building for housing raw-water and service pumps, as well as chemical machinery and storage, the cost of the completed works would have been greatly reduced. Work has progressed sufficiently, however, to make certain that the entire project, comprising a 10,000,000-gallon filtration plant, two pumping stations with installed pumping capacities of 24 mgd and 20 mgd, a small hydro station, a 1,200-kva transformer station, roadways, walks, and other improvements to the grounds, including flood walls and fills, will cost less than $350,000, exclusive of engineering and administrative expense. Thus the peculiar disadvantages of the rough and rocky site have not entirely obscured the marked economy resulting from the shape and arrangement of the filter plant proper and the material of which it was made.

The writer wishes to asknowledge the ingenuity shown by Charles O. Wherley, an assistant engineer with the Commission, in developing many details for which no precedent appeared at hand.

ACKNOWLEDGMENT.—From a paper presented at the eighth annual conference of the Maryland-Delaware Water and Sewerage Association.

Improving State Highway Routes Through Cities

By JOHN W. WHEELER
Member, Indiana State Highway Commission

THE greatest obstacle that the State Highway Commission of Indiana has encountered in trying to improve city streets is the existence of city street railways. The states authorities were confident that if the railway companies would rehabilitate their tracks and properties, the U. S. Bureau of Public Roads would be willing that the state pave the surface from PWA funds. In practically every case, the railway company pleaded "No funds," so that part of the project was thereby halted. It is difficult for a state highway commission to turn out good paving or resurfacing work within cities where street-railway properties cannot be rehabilitated at the same time. It becomes necessary to make the improvement up to the end of the tie and leave the dilapidated street railway in its existing condition. This has a sad effect on the appearance of the work.

Another great difficulty is to devise a proper resurface material which can be applied thin enough to resurface an old brick street, for instance, and join up with a street-car track. Take the case of a street-car track that is in operation and, so far as the railway is concerned, is satisfactory. The top of the rail is approximately level with the top of the old worn brick pavement that joins it. How to put a proper resurface on this brick pavement, and still meet the top of the rail, causes a great deal of trouble. If the resurface material is feather-edged it will break away in the thinner section and leave a bad appearance. If the brick stretcher is raised from the rail over to the end of the tie so that it would be possible to put a 2-inch resurface up against this header, the railway track is thereby depressed below the surface of the new pavement and forms a gutter in the middle of the street, down which water will have to run to an intersection, or perhaps until the street railway turns and allows the water to follow the rail onto a side street. Either one of these methods will prove unsatisfactory. Where the street railway is in a position to raise its tracks the needed amount, the whole program is materially helped.

In other cases it is necessary to construct storm sewers so that the new street or the resurfaced street can be drained. This runs into big money. Every time one of these sewers is built out of the funds originally set aside for the street, it is bound to shorten the pavement project.

Pavement Types for Resurfacing

Wherever the base is adequate but the surface is rough, resurfacing is recommended with an average thickness of 2½ inches. This usually consists of hot or cold binder with a wearing surface of either hot or cold mix asphalt or rock asphalt. Under the Federal regulations it is possible to specify patented pavements by their trade names, as alternates to the above-mentioned resurfacing materials. Where a project is endorsed by the Bureau of Public Roads for new construction, in Indiana it is usually built of concrete, because all these projects are on state highway routes through cities where the amount of traffic is heavy, and from Indiana experience over a term of years, where alternate types of new pavement are called for, cement-concrete pavement has been the lowest priced. This price might, however, change to an extent that some other material would be low.

ACKNOWLEDGMENT.—From a paper presented at the twentieth annual Purdue Road School, Purdue University, Lafayette, Ind.

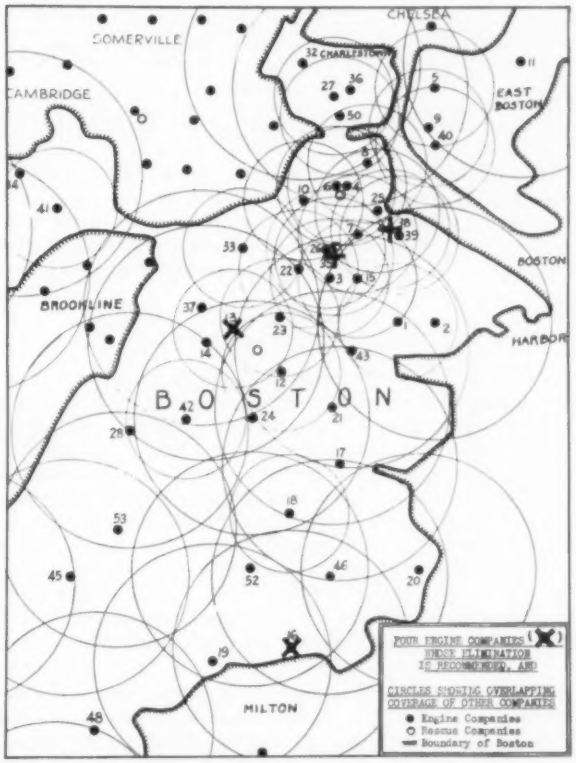
Constructive Economy for Boston's Fire Department

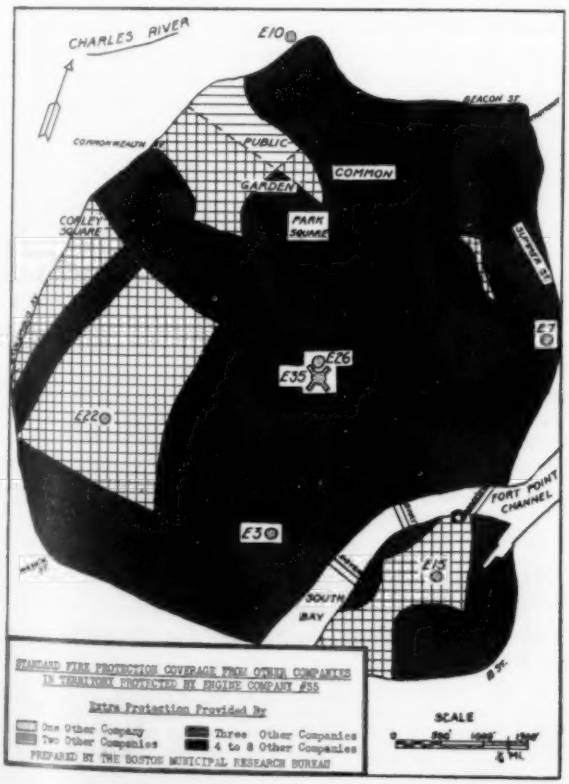
By **H. C. LOEFFLER**
Secretary, Boston Municipal Research Bureau

MANY cities of the United States have probably failed to make adequate adjustment of their fire-fighting equipment for the change from the horse-drawn apparatus of the not very distant past to the motor-driven apparatus of today.

The writer had occasion recently to make a survey of motor equipment serving one large American city. So-called gasoline wagons were in use in the Fire Department to supply gasoline to fire-fighting equipment called out on alarm. For some reason these "wagons," really small trucks, always left for the scene of an alarm after the apparatus had been gone twenty minutes, even though a longer interval was justified on the basis of gasoline capacity of the units involved. About the only explanation for this departmental rule came from the lips of old-timers who stated that from time immemorial the former coal wagons had left after a ten-minute interval and it seemed probable "that some one had allowed that twice that interval would be just about right for motor equipment."

This minor incident may be indicative of similar lack of adjustment in the more important and expensive aspects of the costly fire departments serving American municipalities, particularly in the larger and older cities. Of these financial aspects, one of the most important is the fire districting of cities so as to utilize to the greatest extent





the proper radii of operation for engine companies and ladder companies. This fundamental factor naturally affects the number of fire companies in service, the amount of expensive equipment to be maintained and replaced from year to year, and the original cost and maintenance of the fire stations which house both men and equipment.

Boston's Comparative Costs and Personnel

The Boston Municipal Research Bureau has recently made a study* of its "fire-fighting plant" using the basic approach indicated above. To begin with, however, the following comparison was made of the most recent information available as to operating costs and personnel in the Fire Departments of the 13 cities in the United States with populations over 500,000. The order of listing of the cities starts with the city with highest cost per square mile—Boston—followed in order by the other cities involved; the other bases of comparison do not establish exactly the same order of ranking.

COMPARISON OF 1931 OPERATING COSTS, AND OF 1934 PERSONNEL IN FIRE DEPARTMENTS OF THIRTEEN LARGEST AMERICAN CITIES ON BASES OF CITY AREA, POPULATION, AND ADJUSTED VALUATION

		Cost Per			Men Per		
	City	Sq. Mi.	Capita	$1000 Val.	Sq. Mi.	1000 Pop.	Billion Val.
1.	Boston	$90,600	$5 08	$1 84	37 2	2 07	918
2.	New York	83,200	3 51	1 17	22 5	0 94	321
3.	San Francisco	80,600	5 27	1 07	27 6	1 74	682
4.	Buffalo	65,900	4 45	1 84	23 7	1 56	722
5.	Pittsburgh	49,300	3 72	1 38	16 3	1 21	688
6.	Milwaukee	47,600	3 30	1 41	19 4	1 29	690
7.	Cleveland	39,700	3 10	1 11	14 0	1 06	740

* "Reducing Boston's Fire Department Costs by the Elimination of Four Engine Companies and Two Ladder Companies." June 2, 1934. 25 pp., mimeographed. Price: 50 cents.

City	Cost Per Sq. Mi	Cost Per Capita	Cost Per $1000 Val.	Men Per Sq. Mi.	Men Per 1000 Pop.	Billion Val.
8. St. Louis	39,100	2 89	1 17	15 4	1.13	592
9. Detroit	38,000	3 24	1 40	13 0	1 02	699
10. Baltimore	37,800	3 68	1.21	18 3	1 75	765
11. Chicago	37,400	2 18	0 75	13 2	0 74	313
12. Philadelphia	37,000	2 40	0 89	14.3	0 92	395
13. Los Angeles	13,100	4 46	1 62	4 0	1 23	679
AVERAGE, EXCL. BOSTON	47,400	3 52	1 25	16 7	1 22	607

Sources: Fire Department operating costs, areas, and estimated population in 1931 are taken from U. S. Census Bureau reports. The number of men in the Fire Departments is taken from a publication of the International Association of Fire Fighters dated April, 1934. Valuations are adjusted to estimated true value on the basis of comparative tax rate studies by C. E. Rightor, published in the *National Municipal Review* of December, 1931, and De e nber, 1933.

On the basis of the above comparisons, Boston ranks first or second highest on each of the six tests used. Moreover, Boston's Fire Department costs have shown practically no reduction during the recent years of the depression after allowance is made for the general pay cut in effect for city employees. The Research Bureau therefore undertook a study of those aspects of the fire districting of Boston which are in most evident need of readjustment.

Basis of Districting Study

The Bureau's districting study was based on the standard schedules for the distribution of fire companies which are used by the National Board of Fire Underwriters* for grading municipalities for fire insurance purposes. National Board standards, subject to variation because of special local conditions, call for the location of one engine company within 1½ miles of every point in ordinary districts and within three-fourths of a mile of every point in high-value districts, as classified by the Board. Similarly, one ladder company is required within two miles of any point in an ordinary district, and within one mile of any point in districts classified as high-value. The foregoing distances relate to measurement by the most direct street routes.

Traffic considerations in many instances control the speed of equipment proceeding to a fire. If such apparatus achieves an average speed of 30 miles per hour, the distances here described can be translated into time factors on the basis of each mile requiring two minutes of running time.

Preliminary Graphical Analysis of Location of Stations

The accompanying map of a section of Boston near the downtown area of the city along the harbor shows the location of engine company stations by numbers and circles. (A similar map for ladder companies is not reprinted because of lack of space.) In addition, the map gives the same information for engine companies in contiguous municipalities which would be available locally in case of conflagration, if an adequate system of mutual aid is worked out. The latter subject is not discussed, however, in the report under consideration.

Circles with radii equal to the relevant standard established by the National Board were then drawn around the engine company stations. Circles were used in this preliminary study to show the general picture, although these circular areas vary somewhat from the precise standard areas of coverage as determined by street routes.

The extreme overlapping of many of the circles, especially in the downtown district, shows a large amount of duplication in Boston's engine company equipment above the standards established by the National Board of Fire Underwriters. While special adjustment for considerations such as irregular or obstructed street routes and areas of great potential fire hazard must be made, the pictorial evidence shows a failure to locate fire stations where they can serve most efficiently. The congested locations of the stations probably are due to the establishment of fire districts in the days of horse-drawn vehicles which have been replaced by motor equipment.

Proposed Elimination of Companies

Study of the areas of overlapping on the general map indicated the need for more detailed office analysis and field check-up of at least four engine companies and two ladder companies. Further work by officials of Boston's Fire Department along the lines here presented would undoubtedly lead to the elimination of additional companies beyond the six here discussed in detail, thereby effecting further constructive economies in very high fire-fighting costs without sacrificing adequate fire protection.

The "close-up" office studies of individual fire stations is illustrated in the accompanying map of the territory surrounding Engine Company No. 35. The outer confines of the area covered by the map were determined on a large street map from which the accompanying smaller sketch map was prepared by a tracing and photostating process. Starting at the fire station itself, distances were scaled in conformance with National Board standards, using a map measuring device frequently employed for military purposes. The wheel attachment of the device is run over the actual street routes and the distance traversed is registered on a dial. In this manner an office study was made showing the outlying radial points at a given distance from each fire station which took into consideration the actual street pattern and obstructions such as railroad "dead-ends." Within the area delimited by the foregoing process, the same method was used to determine the areas protected by neighboring companies.

It is evident that a complicated maze of irregular lines resulted from this study showing the areas which had from two to as much as eight-fold fire protection without counting the individual company whose elimination is under consideration. The charts were then simplified by a process of shading which showed four ranges of multiple protection. As a hint to those who may undertake a similar analysis in other cities, the staff of the Boston Bureau found it helpful to show on the working maps, by small arrows adjacent to the boundary line of each area of protection, the direction of the company providing protection. These arrows were very useful in counting up multiple protection.

Adequate Protection Remains

On the basis of the above analyses, supplemented by field examination to determine any unusual conditions, the Boston Municipal Research Bureau decided to recommend the elimination of six companies. It is evident that adequate fire protection facilities would still be available, since the Bureau's graphical analyses show that if the six companies are abolished the following multiple protection under National Board standards would still be available from other companies for the areas involved. The percentages were determined by dividing the territory under study into small squares which were counted and tabulated.

Company to be Eliminated	Percentages of Areas Still Protected By 1 or more Companies	2 or more Companies	3 or more Companies	4 or more Companies
Engine Co. No. 13	100%	74%	21%	2%
Engine Co. No. 16	100%	90%	35%	1%
Engine Co. No. 35	100%	100%	98%	77%
Engine Co. No. 38	100%	81%	64%	38%
Ladder Co. No. 3	100%	97%	60%	28%
Ladder Co. No. 12	100%	72%	28%	4%

The Bureau's report summarized the above findings as follows:

"If the six companies tabulated above are eliminated, no area would have less than the distribution of companies required by the National Board; from 72 per cent to 100 per cent of the individual areas would still be protected by two or more nearby companies, and considerable pro-

* "The underwriters do not undertake to measure overmanning caused by poor station location. Crowding of stations in a manner that necessitates overmanning is not a condition normally objected to by them, but any failure to cover a part of the city adequately is of course a matter enlisting their criticism. No party in interest, except the taxpayers, can object to excessive protection."—From 1931 reports of New Jersey Commission to Investigate County and Municipal Taxation and Expenditures. Report No. 4, p. 45.

portions of the individual areas would be protected by from three to eight other companies. Additional companies frequently respond to fires beyond their standard distance, thus increasing actual protection.

"The proposed station closings and company eliminations have little bearing on available protection in case of conflagration. In that event the important consideration is the adequacy of the city's complete fire-fighting facilities, if necessary including off-shift man power and reserve equipment. In addition, 119 engine and ladder companies are available in 15 of the nearby cities in the metropolitan area to supplement Boston's 84 companies in case of conflagration."

Resultant Economies

A total of 87 privates and officers are assigned to the six companies whose elimination is proposed. In addition, four stations can be closed by proper adjustment after the companies are eliminated. The constructive economy which results is very conservatively estimated at $160,000 annually.

Some might not characterize as "constructive" a proposal which adds 87 men, even though unnecessary, to the large ranks of the unemployed. That problem was therefore considered in the Bureau's report which worked out a program for reducing personnel. To begin with, it was felt that no such argument as the above could possibly be applied to forty "lame duck" appointments last December by the former Mayor between the election and the inauguration of his successor in that office. Secondly, a more rigid policy of retirement for superannuation should be enforced, as has been urged in recent years by two groups of competent experts who have criticized the present compulsory retirement age of 70 as too high. Thirdly, and again in line with a past report, the Bureau urged a general and rigid physical examination of all members of the fire-fighting force and the retirement of those physically incapable of fire-fighting duty. In probably no other department in the city is physical ability more important to the welfare of the community.

Low Rates Increase Power Demand in Tennessee Valley

FIRST reports on results of low TVA rates and the promotional activities of Electric Home and Farm Authority in Tupelo, Miss., and Athens, Ala., have been characterized as highly satisfactory by David E. Lilienthal, Director in Charge of Power for TVA and President of EHFA. At the same time, Mr. Lilienthal intimated that revenue results at Tupelo have promise of bringing even further domestic electric rate reductions for that city and a removal of the present surcharge on commercial and industrial rates.

As shown by Mr. Lilienthal's report, in Tupelo the residential use in July, 1934, showed an increase of 16.2 per cent over June, 1934. July, 1934, showed a 75.4 per cent increase in residential use over February, 1934, which was the last month under old rates. Residential use in July, 1934, was 83.2 per cent over the same month in 1933.

In Athens, where TVA rates have been in effect for two months, the first month, June, showed a 22 per cent increase in residential use over May. In July residential consumption increased 16 per cent over June, and for the period June 18 to July 18, this year, the use was 48 per cent greater than for the same period in 1933.

All these increases, Mr. Lilienthal pointed out, were made in the face of a normal, seasonal decline in power consumption. The full effect of the EHFA appliance program in Athens will not be felt until next month's figures are in.

"These figures demonstrate," Mr. Lilienthal said, "the great possibilities of low rates. The Tupelo system is now in the black and creating a reserve over all expenses. I am satisfied from this showing that the Tupelo rates are now too high instead of being too low, as was charged when we established them. There is no question in my mind that these rates cannot be reduced. The present rates will allow the building up of surplus enough to take off the present surcharges on industrial and commercial rates within a year or a year and a half."

An industrial survey of northern Alabama showed that a substantial number of industries which had been closed because of losses were now opening because the difference in their new power rates was enough to make the difference between a profit and loss operation.

In regard to the marketing of TVA emblem appliances throughout the country, recently announced, Mr. Lilienthal said that although there is a great deal of interest over the country in the EHFA program, there would be no financing of appliance sales in sections of the country outside the Valley for the time being.

The Importance of Landscape Treatment in Highway Development

THE services of the landscape architect are now recognized by many authorities as being essential for the planning and development of fine highways and parkways. Obviously, this means more than merely sending a man into the field to "landscape" a highway after the contractor has completed his job. It is true, of course, that much may be accomplished even at this stage of development, but the great opportunity for supplementing the engineering work (the importance of which is in no way lessened) lies in the original reconnaissance work, acquisition of rights-of-way, surveys, and planning.

The highways should be studied in plan, profile, and section with a view toward their scenic possibilities, as well as from the engineering viewpoint. Beauty can often be combined with utility at little or no extra cost. Adequate study of alignment and profile would preserve and make accessible outstanding scenic views. Avoidance of ugliness, and reduction of cost, may frequently be effected by change of alignment, elimination of excessive cuts, or by planting.

Although planting is important in many instances, it is mentioned here with trepidation, for fear of its being given undue emphasis. There are many instances where planting is decidedly needed, for the purpose of covering slopes to prevent erosion, screening unsightly views, and enframement of vistas. Groups of trees are desirable here and there along the roadside, but not the continuous planting in rows. In many places, the landscape is more attractive with no planting whatsoever. It frequently happens that the best views may be obtained by the cutting of existing vegetation, thus opening up attractive areas.

SIDNEY S. KENNEDY,
District Inspector, National Park Service, State Park Emergency Conservation Work, Ithaca, N. Y.

A Self-Contained, Diesel-Powered Sewage Pumping Station

By BENJAMIN RUBIN

Assistant Civil Engineer, Sewerage Division, Massachusetts Metropolitan District Commission

IN the fall of 1933, the Sewerage Division of the Metropolitan District Commission, Commonwealth of Massachusetts, which provides for the disposal of sewage in Metropolitan Boston, put the Braintree-Weymouth sewer and pumping station into operation. This sewer receives the sewage of Braintree, Weymouth and the Adams Shore section of Quincy, comprising a population of approximately 45,000. Although Weymouth and the Adams Shore section of Quincy are not yet sewered, Braintree has already connected its 13½ miles of sewers into the main trunk line.

The sewage runs in gravity mains varying in size from 50-inch circular to 5 feet by 5 feet 3 inches, and in inverted siphons of 30-, 42-, and 48-inch cast iron pipes, a distance of 2½ miles to the pump-well under the pumping station. This sewage is pumped through a 30-inch cast iron force main 60 feet in length into the adjacent 11 feet 3 inches by 12 feet 6 inches high-level sewer. This discharges into the ocean at a point approximately 3 miles from the pumping station.

The Braintree-Weymouth pumping station is the first on the Metropolitan System to install diesel engines for power. All previous installations on the system, which includes nine pumping stations in Metropolitan Boston, have employed either steam or electricity for driving the sewage pumping equipment.

The Diesel-Powered Pumping Units

At present there are two pumping units, with space and piping provided for the installation of an additional unit of the same size and type when the pumping load makes this necessary. These units are supported by a reinforced concrete foundation 26 feet 3 inches long, 17 feet 6 inches wide, and 6 feet 6 inches deep. A Tarvia joint, ½-inch thick, separates this foundation from the main floor and foundation of the pumping-station building. Thus all vibrations caused by the engines and pumps are absorbed by this foundation and are not passed on to other parts of the building.

Each unit consists of a 125-hp, 10x14-inch 3-cylinder, 4-cycle, solid-injection type Winton diesel engine, mounted on a continuous cast iron base plate extending under the complete unit, and direct-connected by flexible coupling on one end of the shaft to a 16-inch horizontal-shaft, non-clog, DeLaval centrifugal pump. The other end of the shaft is direct-connected to a 10-kw, 120-volt, direct-current Crocker-Wheeler generator. The arrangement and equipment of the units is such that the speed variations of the engine to meet different pumping requirements do not affect the voltage developed by the generator.

Each engine is equipped with a lubricating oil pressure gage, an indicating pyrometer with a switch to accommodate all the cylinders, a tachometer and jacket water thermometers on each cylinder.

Auxiliary Units

To develop auxiliary power and for charging the batteries, a single-cylinder, 4-cycle, mechanical injection, Lister diesel engine unit of 5-kw, 120-volt, direct-current generator is available. This engine is designed with dual compression, giving high compression for easy starting, and low compression for normal operation, and is readily started by means of a hand crank.

Cooling water is supplied from a well located just outside the station, and pumped through the engines by electrically operated, duplicate DeLaval centrifugal pumps, automatically primed at all times. One of the cooling water pumps is sufficient for the entire station, and should the pump in operation become clogged or fail in service, a slight drop in pressure automatically starts the duplicate unit, and should this unit develop trouble or the well supply fail, city water can be admitted to the cooling system.

Automatic stops, which have been furnished on the diesel engines for the cooling water supply and the lubricating system, immediately shut down the engine unit if the pressure on either of these systems drops below that normally required for satisfactory operation.

Air starting is provided for the main units, with the compressed air supplied by duplicate, motor-driven, two stage, air-cooled Quincy compressors. These compressors are capable of charging the three compressed air tanks to full pressure of 350 pounds in 40 minutes, and each tank can supply four engine starts.

Lubricating oil purification is accomplished with a DeLaval centrifuge, which removes any sludge or water which might find its way into the oil. This purifier continually handles the operating oil from the filter of the operating engine and can purify the oil in one engine in six hours.

Exhaust gases from the engines are conducted through water-jacketed pipes through a Maxim silencer and thence to a 5-foot diameter exhaust stack just outside the station. An efficient silencer is also provided on the air intake to the engines.

A duplicate Nash Hytor vacuum priming system is provided so that the pumps are at all times primed ready for starting.

Fuel oil is stored in two 5,000-gallon tanks located in the main engine room, from which oil is pumped by a hand pump to two individual day tanks, each of 50 gallons capacity, from which the engines are fed by gravity flow. Thus accurate records of fuel consumption can be easily kept.

The sewage is pumped under heads varying from 21 to 30 feet, and in quantities varying from 3,500 gallons

MAIN AND AUXILIARY UNITS AT THE DIESEL-POWERED BRAINTREE-WEYMOUTH, MASS., SEWAGE PUMPING STATION

1. Exterior of the station. 2. The main pumping unit. 3. A centrifugal pump, and suction and discharge pipes. 4. The fuel oil tanks and generator end of one of the main units. 5. Left to right, the switchboard, auxiliary engine and main units. 6. The compressors, air tanks, lubricating oil tanks and oil-burning heater

per minute at 270 rpm, to 10,500 gallons per minute at 360 rpm.

From this description it will be noted that the plant is entirely self-contained and capable of operating should any one unit or piece of equipment fail.

Fuel Consumption

Fuel guarantees at the various operating conditions were made as follows, on the basis of fuel having a heat value of 18,700 Btu per pound:

Gallons per Day	Total Dynamic Head, Ft.	Pounds of Fuel per Million Gallons
5,000,000	25	89.3
10,000,000	28	74.0
15,000,000	30	71.8

The average fuel consumption per million gallons, based on the guarantee, totals 78.36 pounds, or 10.44 gallons, which at 5¾ cents per gallon gives an average fuel cost per million gallons pumped of $0.60. In the contract, a clause provided for a penalty or bonus of $300 for each per cent or fraction thereof that the actual performance deviated from the guarantee on average consumption made by the contractor. On actual tests under supervision of the Commission, duplicating actual operating conditions, a very substantial bonus was earned for performance better than guaranteed.

International Housing Congress, Prague, 1935

THE International Housing Association announces that it will hold its next Congress in June, 1935, at Prague, Czechoslovakia. The following subjects will be dealt with:

1. The technical equipment and installation of the small dwelling.
2. The reconditioning of slums, which in many towns recently has become a question of the most urgent importance.
3. Reports on subsistence homesteads (short-time workers' settlements) and homesteads for those who will have to earn their entire living out of this homestead.

Concurrently with the discussions an exhibition of plans will be held to illustrate the themes. Exact details of the program will be available later from the Secretariat of the International Housing Congress, Hansa-Allee 27, Frankfort a/M, Germany. Professor Franz Schuster, General Secretary.

Chlorination at the Sewage Treatment Plants of Greenwich, Connecticut

By GUY E. GRIFFIN
Sanitary Engineer, Greenwich Sewer Commission

GREENWICH is a high-class residential town situated on Long Island Sound, about 30 miles from New York City. It is made up of several sections, four of which have separate sewer systems and sewage treatment plants. Low ridges separate the four main drainage areas. Topographical conditions make it necessary to provide small, automatic pumping stations for six subdistricts at Old Greenwich and one at East Port Chester.

The East Port Chester Plant

The East Port Chester plant, built in 1917, consisted at first of three septic tanks, and a small building to house an open well into which sludge was drawn from the tanks, a centrifugal sludge pump, a chlorine contact chamber discharging over a rectangular weir, and a chlorinating machine. It was originally intended that the sludge should be pumped into a barge in the Byram River and dumped out at sea. Later, a small open sludge drying bed was built at one side of the building, and still later two larger open beds were constructed. These have since been covered by a glass enclosure.

The use of the open sludge well in the building was eliminated about two years ago by piping directly through it from the tanks to the sludge pump. This change did away with a damp, sometimes offensive and possibly a dangerous condition in the building.

The Grass Island Plant

This plant, built in 1918, consists of ten Imhoff tanks, and five open sludge beds, totaling 9,600 square feet in area. Originally there were only two sludge beds, of 3,200 square feet but three beds have since been added. A building houses a covered sludge well, a centrifugal sludge pump for dosing the beds, a centrifugal pump for furnishing settled sewage to hose the gas vents and wash down the tanks, a chlorine contact chamber, discharging over a rectangular weir, and a chlorinating machine. Sewage flows through the plant by gravity.

The Imhoff tanks are typical of the period in which they were designed, being rather shallow as compared with more modern tanks. The sludge space is insufficient to allow storage of enough digested sludge to properly seed the fresh solids, and considerable foaming results. Lime has been used to a considerable extent in an effort to control foaming, but with little success.

Late in 1932 a grit chamber was completed on each of the trunk sewers leading to the plant. These chambers have the novel feature of perforated pipes laid longitudinally in the bottom, through which water from a hydrant is flushed weekly to remove organic matter which may have settled with the grit. Before the installation of these chambers, grit had accumulated to such an extent in one of the Imhoff tanks that sludge could not be drawn from it. The tank had to be pumped out and the grit removed with a "mud hog."

The Cos Cob Plant

This plant, built in 1930, has five septic tanks, to which all the sewage is pumped. The incoming gravity sewer discharges into a suction well. Vertical centrifugal pumps are provided in a dry room adjacent to the suction well, with the motors on the ground floor of the pumping station. There are two sewage pumps with a combined capacity of 3 mgd and an 8-inch vertical centrifugal sludge pump, which may also be used for sewage. Sludge is drawn by gravity from the tanks through manholes to a covered sludge well at one side of the sewage well. An auxiliary gasoline engine-generator set provides current in case of power failure. The sludge beds are built on top of the tanks, and drain back into them. A glass enclosure covers both the beds and the tanks.

The Old Greenwich Plant

This plant, built in 1926, consisted of three septic tanks with two sections to each, with suppressed roofs and submerged inlet and outlet. There were two sludge beds under a glass enclosure. A building housed a sludge well, a centrifugal sludge pump, a baffled chlorine contact chamber, and a separate room, as at Cos Cob, for chlorine equipment.

At the beginning of 1932 it became desirable to make changes at this plant. Several investigations had been made by various engineers to determine what changes and additions would be necessary, and early in 1932 the Commission retained Metcalf & Eddy to design and supervise the construction of changes and additions to the plant.

The first change was the reconstruction of the sludge beds. The old beds were found to be badly clogged, not only in the filtering material but in the underdrains as well. New underdrains and new material in layers varying in size from coarse stone at the bottom and around the drains, to sand at the top, were placed on top of the old bed.

By November 1, 1932, the additions were completed. They consist of a bar screen with 1½-inch openings, two covered plain sedimentation tanks, equipped with Link-

Belt scraping equipment, a heated separate sludge digestion tank, two additional sludge beds under a glass enclosure, the necessary pumps for moving the sludge, and a combination gas- and coal-fired boiler for utilizing the sludge gas in heating the digestion tank and building.

A new small building houses the rack chamber, the motor for driving the sludge collector, a Rex Simplex pump for pumping the raw sludge to the digestion tank, and valves on sewage and sludge piping. A gooseneck branch pipe from the sludge line discharges through a quick-opening valve into a bell-mouth pipe located on the first floor, in order that the operator may observe the character of the sludge being pumped.

The digestion tank, 20 feet in diameter and 25 feet deep, has a Downes floating cover. Five 1½-inch pipe coils in the lower half of the tank provide for the heating. The hot water is circulated through this coil and a coil in the boiler by a centrifugal pump.

Two flame traps in parallel are provided on the gas main in the boiler room. Beyond these the gas line branches to the gas burner in the boiler, and to a pressure relief valve on a line running to a waste gas burner outside. This waste gas burner is provided with a pilot flame, and a spark plug, for ignition. Both the gas main and the waste pipe drain to a condensate trap. The gas line to the boiler and the waste line are each provided with thin plate orifices, and pressure tubes leading to Bailey flow recorders located on a panel in the laboratory. The panel also carries temperature recorders for registering the temperature of the outdoor air, the temperature of the sludge near the center of the digestion tank, and the temperature of the circulating water to and from the coils in the tank.

The International boiler is designed for both gas and coal fuel and, besides heating water in the coil, furnishes steam to space heaters in the building. The Webster gas burner is of the regenerative type with a Minneapolis-Honeywell automatic gas valve, controlled either by steam pressure or boiler water temperature. A pilot flame is so arranged that, should it go out, the gas valve cannot open.

The new sludge bed enclosure, furnished by the American Moniger Co., has top sashes that swing out and inswinging bottom sashes on all four sides. Both old and new enclosures were equipped with power outlets for operating a portable Link Belt conveyor, provided for loading dried sludge into a truck.

The new sedimentation tanks were put in service on October 27, and the digestion tank on October 31, 1933.

Chlorination at the Greenwich Plants

The effluent from each of the plants is chlorinated during the summer from approximately May 1 to October 1. Previous to 1932, chlorine had been purchased in 100-pound cylinders at a price in 1931 of $5.40 per hundred weight, not including transportation. By building a platform at the height of a truck at each of the plants, it became possible to handle ton containers, buying a carload of 15 cylinders at a time, distributed among the four plants. In 1932 the price in ton containers was $2.29 per hundred weight delivered on the platforms, against a bid of $5.50 per hundred weight in 100-pound cylinders. This represented a saving of $1,926 on 30 tons, or approximately 59 per cent. In addition to the financial saving, practically all labor of handling was eliminated, for once the tanks are delivered on the platform and the valves set vertically, they need only to be blown off and connected by heavy copper tubing to the pipe line leading to the chlorinator. No scales were provided for weighing the cylinders, for the dosage is governed by the residual chlorine test, and the daily application is computed from a record of settings of the chlorinator.

At the outset considerable difficulty was experienced at East Port Chester, due apparently to a leaky tube inside a cylinder, allowing liquid chlorine to reach the machine. This caused freezing and the destruction of a rubber float. After locating the difficulty, it was overcome by the simple expedient of rolling the tank over and using the other tank valve.

At East Port Chester an experiment in pre-chlorination of one of the septic tanks was carried out for a time during 1933. The chlorine solution was applied at the narrow inlet to the tank from the end of the chlorinator hose, where it should receive good mixing. For about a week the required dosage to secure a satisfactory residual, starting with a clean septic tank, was about the same as for post-chlorination. During this period no scum formed in the tank. At the end of the period scum began to form, and the required dosage began to increase and continued increasing during the period of the experiment from 16 to 64 ppm. This increase was apparently due to the chlorine demand of the increasing sludge accumulation, and seems to show that pre-chlorination of a large septic tank is not economical. Upon returning to post-chlorination with a clean tank, the chlorine demand dropped to an average of 15 ppm during the next operating period.

Near the end of the 1933 season, pre-chlorination was tried at Old Greenwich. The chlorine was at first applied from the end of a hose, and then through a homemade grid placed at the inlet end, just inside one of the sedimentation tanks. The dosage required for one tank was more than for post-chlorination of both tanks, and good distribution was not secured. The point of application was then changed to the inlet sewer just ahead of the bar screen. It was then possible to reduce the dosage for both tanks to an amount equal to or slightly less than for post-chlorination and secure a satisfactory residual after the sewage had passed through the sedimentation tanks and chlorine contact chamber. The pre-chlorination reduced the amount of sludge rising to the surface over the hoppers, and practically eliminated the offensive raw sludge odor which had previously been present in the rack room when pumping and sampling the raw sludge.

ACKNOWLEDGMENT.—From a paper presented before the New England Sewage Works Association.

Needed: More Well-Trained Planners

DURING this period of widespread unemployment, well-trained city planners with some experience have found their services in demand. This recognition of the necessity of city, county, regional, state and national planning is encouraging to the profession and an assurance to the nation that at least some public-works and relief projects are being developed as part of farsighted plans. Doubtless even more projects would have such benefit if a larger number of trained planners were available. For example, the Harvard University School of City Planning reports greater demands than it can meet for its graduates who have even a minimum amount of actual experience in planning. Of course these demands may not continue without a break, but it is certainly true at the moment in planning, as it is in few other professions, that there are too few properly qualified men to meet the demands of the day. Unfortunately, this shortage cannot be overcome in a moment. In the case of the Harvard School, approximately three years of study are required of candidates for the degree of Master in City Planning, and of course these candidates must already possess a Bachelor's degree from a college or scientific school in good standing.

There is every reason to believe that during the coming period of reconstruction the planning profession will have an increasingly important part to play if it is suitably prepared.

HOWARD K. MENHINICK.

A Study of Methods of Building Low-Cost Bituminous Roads—I

Surface Courses, Surface Treatments, Dust Treatments, Soil Treatments

By **J. T. PAULS**
Senior Highway Engineer, U. S. Bureau of Public Roads

LOW-COST road construction and maintenance require the greatest possible use of local materials. For this reason many types of surfacing have been developed calling for the use of a wide variety of materials and methods of construction.

In designing and constructing low-cost roads it is vitally important to consider the character of the subgrade soil and such other factors as moisture and climatic conditions which, to a large degree, control their behavior. The base should be so designed as to best utilize the natural value of the subgrade soil, and only such additional selected materials should be introduced into the base construction as are necessary to correct deficiencies of the natural soil. For example, the low-capillary clay soils found extensively in large sections of the central states, particularly in Oklahoma, Kansas and Minnesota, retain their high supporting value when protected against surface displacement in the presence of excessive moisture. It is apparent, therefore, that the design of a base and surface for this type of soil should be such as to preserve its naturally high supporting value. The satisfactory behavior of the thin mix mats of Kansas and Minnesota, and of other types of bituminous surfaces which have been built over very thin base courses on similar soils, illustrates the adaptation of the design to utilize the favorable characteristics of the natural soil.

In the case of the very silty soils which by themselves have low supporting value, the problem is one of increasing the natural stability. Experience has shown that this is best accomplished by admixing a local granular material to the roadbed soil rather than by laying a base course. This method requires the use of less additional material and utilizes the natural qualities of the soil.

The very sandy soils have characteristics which make them particularly adaptable to low-cost road construction.

SURFACE TREATMENT CONSTRUCTION
Good riding qualities are dependent on careful spotting and broom dragging of the cover stone

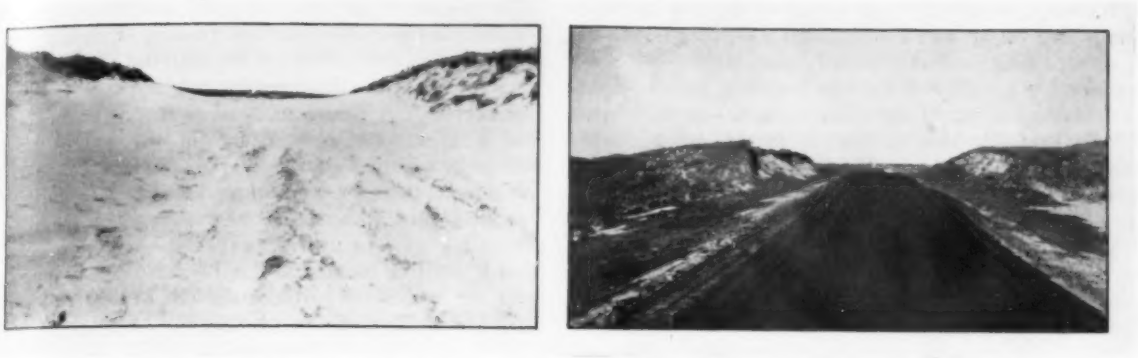
They often have high natural supporting value when surfaced, and in cases where they are lacking in stability they are easily stabilized by the admixture of suitable aggregate or bituminous material. When these sandy soils are well graded and contain a moderate amount of dust, but not in excess of about 15 per cent, they are suitable for use as the aggregate in mixed-in-place bituminous surface construction. Examples of the use of this type of material in bituminous surface construction are the treated blow sand roads of Nebraska and the sandy soil roads of the coastal areas of Florida and South Carolina.

It is of the greatest importance to secure a base which will not develop plastic properties under changing moisture conditions. An increase in the moisture content of the base generally occurs after the surface is laid. This is sometimes of great value in increasing the stability of certain types of materials, particularly the sandy soils. For certain other materials, however, which contain a high percentage of clay or other absorptive material and therefore become plastic with an increase of moisture, failure of the surface often occurs. This explains the unsatisfactory behavior of many roads as bases for bituminous surfaces even though their stability had been satisfactory when unsurfaced. To guard against failure of this type, the base when composed of granular material should not contain more than about 10 per cent of clay. A frequent cause of base failure on clay subgrades is the gradual intrusion of clay soil into the base structure, resulting in ultimate loss of stability and failure. Priming the subgrade and using a choked or close graded material in the base course are means successfully used to prevent failure from this source.

Because low-cost roads are generally built on flexible bases, it is most important that the bituminous surface shall also be pliable in order that it may adjust itself to movements in the base without cracking or crumbling. Failure of bituminous surfaces because of excessive rigidity is a serious and common fault. Insufficient bituminous material, and the use of low penetration asphalts or liquid bituminous materials which produce hard brittle residues in the surface after curing, are factors which tend to cause excessively rigid surfaces.

The design of the low-cost bituminous surface depends to a large degree on the type and character of local material available. This has brought about the development of numerous types of surfaces and explains why we often find wide differences in specifications for aggregates and methods of construction.

The preparation of specifications for low-cost surface construction is very much a case of preparation for a particular project. It is generally agreed that standards either for the aggregates or for methods of construction



"BEFORE AND AFTER" PHOTOGRAPHS OF A NEBRASKA BLOW SAND ROAD WHICH WAS ROAD-MIXED WITH BITUMINOUS MATERIAL

are not as adaptable to low-cost design as they are to the more expensive types. In other words, the design and method of construction in low-cost road work depends largely on the conditions existing for each particular project.

Grouping of Bituminous Types

Because of the large number of widely different bituminous surfaces, it is difficult to classify the various types satisfactorily. The following grouping is used for the purpose of this paper:

1. *Bituminous Surface Courses.*—In this group are included all types of bituminous surfaces built to a thickness of one inch or more. The more important types included in this group are the plant and road mix surfaces using both close and open graded aggregates covering a wide range of maximum sizes.

2. *Bituminous Surface Treatments.*—In this group are included bituminous wearing surfaces of less than one inch thickness. Of the more important types in this group are the single and double surface treatments, blotter treatments, and the thin mix mats.

3. *Bituminous Dust Treatments.*

4. *Bituminous Soil Treatments.*

Bituminous Surface Courses

Plant and road-mix surface courses are built extensively in all parts of the country, using materials covering a wide range in type and character. Some typical examples of this work will be given.

In Florida the natural roadbed sands are road-mixed with a quick-curing type of bituminous material such as naphtha cut-back asphalt or cold application tar. The sand is fine-grained but of a rather open type, all passing the No. 10 sieve, and very little, generally less than 2 per cent, passing the No. 200 sieve.

Road mixing of the sandy soils is also done extensively in South Carolina and Nebraska. The materials differ, however, from that which has been used in Florida. The South Carolina soil contains an appreciable amount of dust, while the Nebraska blow sands, which are finer than the Florida sands, normally contain very little. With the road oils and medium curing cut-backs which have been used in Nebraska, it has been found advantageous to increase the dust content of the blow sand to approximately 15 per cent in order to secure satisfactory stability. Road oils and naphtha cut-back asphalts are used in the South Carolina work. In general, experience has shown that slow-curing road oils and medium-curing cutbacks should be used when the aggregates contain more than 5 per cent of material passing the No. 200 sieve, and the quicker-curing types when less than this amount is present.

In the western states the plant and road-mix methods are generally applied to construction in which close graded local crushed aggregates are used. The aggregate is usually graded from ¾-inch to dust, with sufficient friable soil or other suitable non-plastic material added to increase the material passing the No. 200 sieve to about 5 to 12 per cent. For this type of construction, it is important, particularly when road oils are to be used, that the aggregate shall have high inherent stability, since the slow-curing liquid materials tend to decrease rather than to increase the stability of the mixture.

A typical grading would be:

Passing the 1-inch round screen	100	per cent
" " ¼- " " "	30– 70	"
" No. 10 sieve	35– 60	"
" " 200 "	5– 12	"

Both road oils and medium-curing cut-back asphalts are used for mixing with the close graded aggregates. Mixtures of this type are easily damaged by excessive moisture contents, which cause loss of stability. It is therefore important to provide a base which will not carry excessive moisture to the surfacing mixture. It is also essential, in order to avoid the necessity of early scarifying and relaying of the surface, that the mixture shall be essentially free from moisture when laid. Experience has shown that moisture in the mix in excess of 2 per cent usually results in early failures.

Materials of much higher viscosity are used in the plant or portable plant mixes than in road-mix construction. Experience has shown that the materials with the higher viscosities have certain advantages, among which are their superior resistance to the action of water and their tendency to produce more stable mixtures. The practice generally followed, therefore, is to use the highest viscosities suitable to the method of construction.

The surfaces are generally built from 1½ to 2½ inches in compacted thickness, using about ¾-gallon of bituminous material to the compacted inch, with some variation above or below this amount, depending upon the absorptive quality of the aggregate and the amount of fines. Several formulas, most of which are based on the surface area of the aggregate, are widely used for determining the amount of bituminous material. These have, in general, proved satisfactory in connection with the use of road oils. Experience has shown, however, that for materials such as cut-back asphalts, which develop a heavy residue in the

road surface, somewhat higher percentages are desirable. This is true for at least two reasons: first, because the use of a hardening material usually entails the loss of a considerable quantity of volatile fractions, which reduces the bitumen content of the mixture; and, second, because with the harder residue material thicker films may be used without loss of stability. This being so, the richer mixtures may be used and advantage taken of their greater durability and resistance to water action.

Following are some typical formulas now being used for determining the amount of bituminous material required for the close graded type of plant and road mix construction:

California ..... $P = .02A + .045B + \begin{cases} .15C \text{ for fine-grained aggregate} \\ .18C \text{ for average aggregate} \\ .20C \text{ for coarse aggregate} \end{cases}$

Utah .... $P = .02A + .033B + .195C + H$, where H is an absorption factor usually taken as 0.5

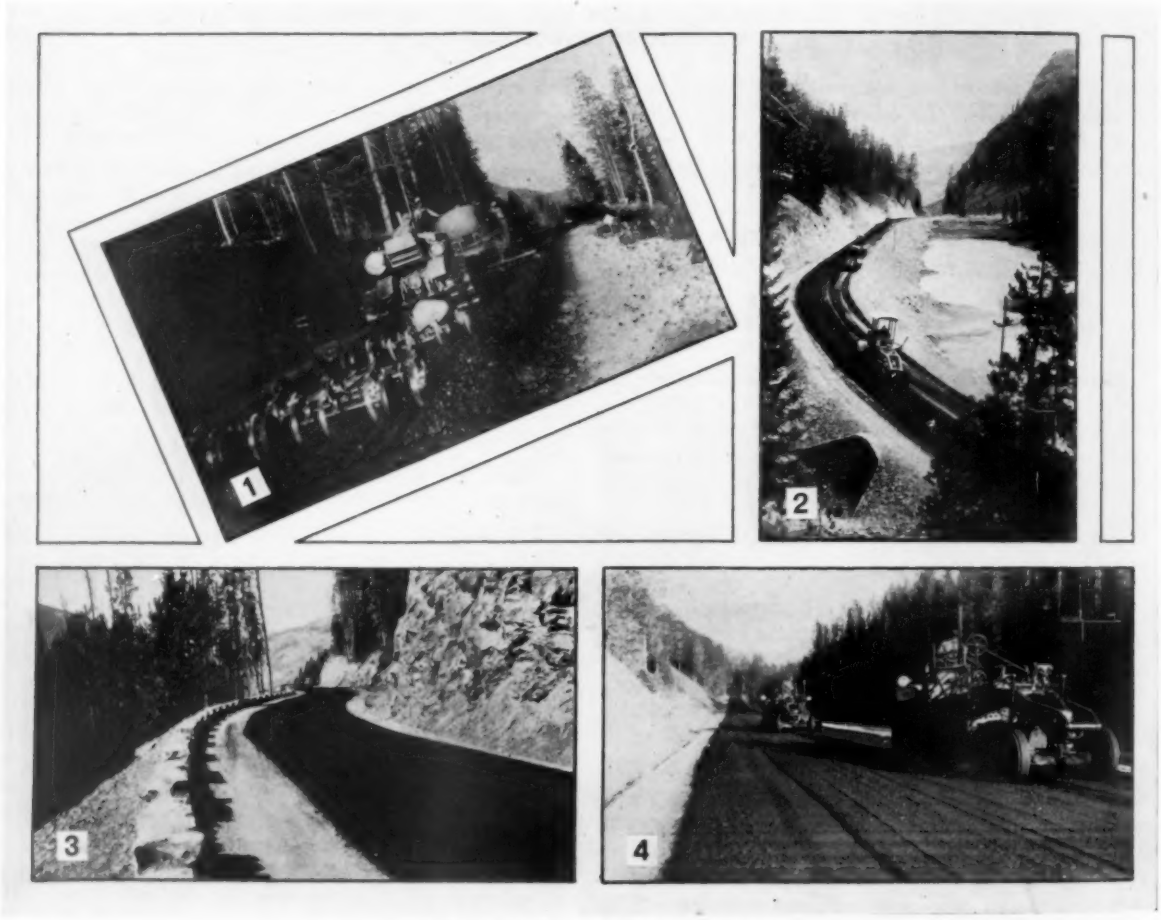
Wyoming ..... $P = 1.4 (.015A + .03B + .17C)$

In all these formulas:

P = per cent of bituminous material
A = per cent of aggregate retained on No. 10 sieve
B = per cent of aggregate passing No. 10 and retained on No. 200
C = per cent of aggregate passing No. 200 sieve

Retread

Another important type of bituminous surface used extensively, particularly in the central and eastern states, is the open graded coarse type, better known as retread. This type is adapted to both the plant and road-mix methods of construction. The size and grading of aggregates used vary widely, depending on the material available. Generally, two sizes of aggregates are used in constructing the surface. A coarse material is employed in the mix, and a finer material as cover for the seal or keystone treatment which is generally applied, except when the aggregate contains an appreciable amount of material passing the ¼-inch screen. The aggregate should, in all cases, be well graded to provide stability. It is also necessary that it shall be tough and durable, since in the open mixture the individual particles are not as well protected as they are in the more closed types.



TYPICAL ROAD-MIX CONSTRUCTION

1. Preliminary mixing immediately following each application of bituminous material. 2. Mixing with blade machines. 3. Mixing completed and partly spread. 4. Spreading the mix with blade machines

Typical gradings and sizes of aggregate used in this type are as follows:

Coarse open aggregate type—

Mix	
Passing 1½-inch screen	95 to 100 per cent
" ½ " "	0 to 10 "
Seal or keystone treatment	
Passing ⅜-inch screen	95 to 100 per cent
" ¼ " "	0 to 10 "

Coarse moderately open aggregate type—

Passing 1 inch screen	100 per cent
" ¼ " "	40 to 70 "
" No. 200 sieve	Less than 5 "

Cold application bituminous materials of the rapid-cur-

ing type such as coal tars, naphtha cut-back asphalts and asphalt emulsions are used in this construction. Materials of high viscosity are preferable in that they do not tend to run off the aggregate, and also in that they provide thicker and tougher films on the aggregate particles. Applying the bituminous material in several increments when road mixing is employed is also beneficial in providing greater film thickness in this type of construction.

Bituminous Surface Treatments

The single and double surface treatments have been used extensively and are probably better known than the other more local types of treatments. Graded coarse aggregates are used. The main difference between the two types is the size of aggregate and quantity of bituminous materials used. The single treatment provides a mat of from ½-inch to ¾-inch in thickness, depending on the size of the cover stone, while the double treatment is often built to provide a mat as much as 1 inch in thickness.

It is necessary that the bituminous binder materials used in these treatments be of a type that cures quickly to give an adhesive semi-solid residue. Both cold and hot application materials are used. The hot materials are considered more satisfactory for the original construction in that they give a more pliable mat which is less apt to break or crumble with movements in the base. For retreatment work, on the other hand, the cold application materials have the advantage over the hot application materials in that the cover material may be bladed or dragged to correct surface irregularities which have developed in the original surface.

Typical procedure in the construction is as follows:

For the single treatment—

1. Remove excess dust and fines from the surface.
2. Prime the base and allow surface to dry and penetrate undisturbed for a period of about 48 hours. From 1/3- to ½-gallon of a low viscosity material, such as a tar or a medium curing cut-back asphalt, is generally used for priming.
3. Apply from 1/3- to ½-gallon of bituminous binder to the primed surface, the amount depending upon the size and amount of stone cover to be used. A satisfactory guide is to use approximately 1/10-gallon of bituminous material for each 10 pounds of stone cover. It is very important that the bituminous material in this application be applied uniformly and without breaks.
4. Apply cover stone at the rate of 35 to 50 pounds per square yard. A clean, tough, open graded, aggregate, preferably of a one-size material, should be used. Although the sizes used differ widely, 1 inch is about the maximum size suitable for this type of treatment. Careful spotting and broom dragging to secure a uniform and smooth covering are essential, for this step in the construction largely determines the ultimate riding qualities of the surfaces.
5. Roll thoroughly to key and seat the cover stone.
6. A seal treatment consisting of about ¼-gallon of the binder material with a light cover of screenings is generally applied to complete the construction.

For the double surface treatment—

Preparation of the base and application of the prime are the same as for the single treatment.

The first binder application, consisting of approximately 0.35-gallon per square yard, is followed by a cover of 65 to 70 pounds of 1½- to ½-inch stone, which is spotted, broom dragged and rolled.

Additional binder material is then applied at the rate of about 0.45-gallon and covered with 30 to 35 pounds of ½-inch to No. 10 stone, which is also spotted, broom dragged and rolled.

This completes the construction, except that additional brooming and rolling are generally required at intervals during early service.

The thin mix mats which are built extensively in Kansas are somewhat similar, except for thickness, to the coarse close graded plant and road mix surfaces built by the western states. These mats are, however, generally constructed on soil bases which have been stabilized to some degree by the incorporation of gravel during maintenance but without any intermediate base structure. Both road oils and medium curing cut-back asphalts are used in their construction. These mats are proving fairly satisfactory on the heavy non-capillary clay soils.

The construction consists of priming the graveled subgrade with about 0.6-gallon per square yard of light road oil, followed, after an interval sufficient to allow absorption of the prime, by the construction of a thin mixed-in-place surface with sand gravel or crushed rock, ¾-inch to dust with some fines added. General practice is to use about 500 cubic yards of aggregate to the mile with about 0.8-gallon of roal oil per square yard for the mixture.

EDITORIAL NOTE.—This article, from a paper presented at the University of Michigan Highway Conference, will be concluded in the October issue with a discussion of Bituminous Dust Treatments, Soil Treatments, and Tests of Liquid Asphaltic Materials.

Nation-wide Home Modernization Campaign Urged

EMPHASIZING the fact that "wealth is not created by the curtailment of production," Lewis H. Brown, President, Johns-Manville Corporation, discussed "Recovery and the Durable Goods Industries," on June 30, before the New York Building Congress. Speaking as a member of the Durable Goods Industries Committee, Mr. Brown made a strong plea for the continuance of the essentially democratic institutions characteristic of this country. In the opinion of the Committee as reflected by the speaker, "Any plan of action that might be recommended must be predicated upon large-scale collective action for an emergency period only and contemplate the return to the American people, as quickly as possible, the operation of their daily affairs with a minimum of regulation and interference."

Urging a nation-wide reconditioning and home-building campaign, to be financed by private capital with Federal insurance under the terms of the new National Housing Act, Mr. Brown quoted from the report of the Durable Goods Industries Committee in part as follows:

"A thorough national modernizing program would so change the aspect of America as to go far toward dispelling depression as a mental state. It would, in our judgment, be the best answer to stimulating immediate construction, for it ordinarily requires no long periods of planning, may be on a modest scale of individual projects, does not necessarily require long-term financing, and in many instances can be paid out of current income. A campaign for modernizing is thoroughly practical because it is needed and is economically justified.

"Such a plan will call for the united support of the Federal, state and local governments, the national and local chambers of commerce, the banks and business houses, particularly those dealing in construction and building products, the women's clubs, as well as all other civic organizations whose public influence is of inestimable value. The program must essentially have the whole-hearted assistance of those agencies responsible for the molding of public opinion who will give freely of their unqualified support to the movement in the national interest. Without their fullest help the campaign cannot reach complete fruition.

"The campaign should be for a prescribed period. While the practical note must be present, and its success must benefit many individual business enterprises, its main theme should be altruistic and in the public good, a call which will find a ready and patriotic response from all those unselfish American citizens in a position to help in providing work for the unemployed."

There Is Hope Even for the County

By HENRY S. CURTIS
Ann Arbor, Mich.

OUT of the New Deal in recent months has developed a greatly increased interest in government and planning. This has come about partly because we have learned that a great weakness in business and politics has been the failure of executives to see far enough ahead and so to plan that the work of today might lead to the work of tomorrow, and that less time might be spent in undoing what yesterday did wrong.

County Government

An essential weakness of the county is that its officers are generally chosen on the basis of personal popularity or influence, not on the basis of their knowledge of the work they have to do. This is a poor way to choose a clerk, an assessor or a treasurer. The county needs a county board corresponding to a city council or a state legislature, and an executive officer corresponding to the mayor or city manager. The executive officer should choose his technical staff and be responsible for them. These principles are well agreed to, but most counties are still going on in the old way from mere inertia.

The first step in reorganizing the county should be to drop the townships. Under pioneer conditions, with the ox-cart and a mud road that wound around the stumps, a trip of six miles and back was a day's journey. The township was a logical unit under such conditions, but today, with the good road and the automobile, a trip to the county-seat usually requires only a few minutes. The township government represents an expense which is unnecessary, and its petty, untrained officers stand in the way of progress. While nearly all the counties of Illinois have their regular quota of townships, there are twelve counties without them. The expense of the county government is no greater where there are no townships, and the entire expense of the township government is saved. There is a bill before the Legislature of Michigan at this time to submit to the people an amendment abolishing the townships and reorganizing the counties. It scarcely requires a plan to tell us that this should be done.

County Schools

The school system in many counties is in a similar antiquated state, a mere survival from pioneer days, when there were no trained teachers, and the directors chose as teacher some local girl who was not illiterate and was willing to "keep" the school. They had had no training in judging her qualifications or the success of her work. The logical organization, however, has been in use in the cities and some counties for many years. It consists of a county school board, which chooses a competent superintendent to supervise the schools and recommend to the board the teachers to be employed.

The one-room county school is also a survival from pioneer days. It is slowly disappearing. Farms are steadily growing larger, and families are growing smaller. There are many schools scattered over the United States with only eight or ten pupils for eight grades. This puts only one or two children in a class—too few for emulation. With ages ranging from five to fourteen, there are few things the children can do together. There are not enough of any one age to play organized games. It is often cheaper to transport the children, so that the teacher may have thirty or forty in one grade instead of a dozen in eight different grades.

The advantages both in specialization and in supervision are obvious. The social reasons are not less important. Children need to be with other children of the same age. They make acquaintances easily and soon get over the diffidence that has characterized the country child. Most of the earlier social organizations of the country have disappeared. It no longer has its husking bees and quilting bees, its log rolling or even its neighborhood threshings. The country church is dropping out. Instead of five or six one-room schools in a township, there should be a consolidated or community school to every three or four townships.

Such a school should be built for community as well as school uses. It should have twenty to forty acres of ground with a picnic grove and, if possible, a swimming hole at the back. It should have ample ground for gardens and the teaching of agriculture, as well as for baseball, basket-ball and tennis for the school during the day and for the public at week-ends and evenings. There should be a teaching force and a principal who is also the community secretary.

The school building should contain, besides its classrooms, a good-sized auditorium for school assemblies, but not less for public meetings, lectures, debates, dramatics, musicals and movies, and perhaps for church on Sundays. The gymnasium should provide for class work, but also for basket-ball, volley-ball, badminton, and dancing in the evening. There should be a cafeteria available both for school and for neighborhood gatherings. There should be a well-furnished social room or neighborhood parlor for teas, committee meetings, and other neighborhood uses. The community school should also be a branch of the county library.

The County Library and the County Health Service

There is no apparent reason why the same library facilities should not be furnished to any well-populated county that are furnished to city people. California has shown us the way with its county library system and county trucks to deliver the books to branches in the county. In a study of Washtenaw County, Michigan, we have found scarcely a farm home without a paper, and most of them take from one to eight magazines. Good roads and the automobile have abolished distance and made the country accessible. Many have expressed a desire for an accessible library. The community school offers the natural substation for the distribution of books in a farm community.

Standards for health service are well established for city schools; they require approximately one doctor for each two thousand children. Such an arrangement for the county would require a county health office with a staff of doctors, nurses and oral hygienists, who would give the regular health examinations, clean the children's teeth and give vaccinations for diphtheria, tuberculosis and smallpox as needed. This force should locate the crippled, the deaf, the blind, and the feeble-minded children, and see that they get appropriate care. Many counties already have such a force.

The county plan should also hold in view some sort of health service to adults on an annual payment basis, such as is now offered by universities to their students and is slowly being worked out in many different forms all over the world.

A County Forest and Game Preserve

Just now there is an unusual opportunity to secure land for county forests and game preserves. The Department of Agriculture is seeking to retire the marginal land unsuited for farming. It has paid farmers to let ten per cent or more of their land lie idle, a very expensive method, without permanent results, but it is planning soon to buy up some 50,000,000 acres. Equitably distributed, this would be about 25,000 acres for each agricultural county, a little more than a township, and about the same per cent of the county area that our more progressive cities are now setting aside for parks and playgrounds, namely, a little more than six per cent. Surely the county which has located the land available with some estimate of the cost stands a better chance of getting a good-sized slice than a county without a plan.

We are just entering an era of leisure such as no great people ever had before. With the country nearly as accessible through good roads as the city, the county is sure to become the city's playground, where most of the parks and camps and bathing beaches should be furnished. The marginal land that needs to be withdrawn from cultivation is of three sorts—marshes, hillsides and poor soil. Never except in times of extreme high prices does this land yield a net return in agriculture, while much of it is admirably adapted for other uses. The Government is planning to spend from $25,000,000 to $50,000,000 to restore the breeding-places for waterfowl. For this the marsh land and marsh lakes are best suited.

Sand and gravel farms yield only a very meager return for the labor spent on them. Enterprising farmers avoid them or move away, leaving them to the shiftless and improvident. Much of what was the best pine land of Michigan, where pine once stood thick more than a hundred feet in height, is of this sort. Timber is about the only profitable crop this land will raise.

The case of hillside farms is much the same. Steep hillsides cannot be worked by modern machinery. If worked, the fertility washes off into the valleys to clog the streams and drive away the fish. Erosion with deep gullies follows if cultivation is continued. We are now raising only twenty-five per cent of the timber we are using, and most of that comes from the far Northwest, from which the transportation costs are often more than the original cost of the lumber. Every county should provide in its own locality the wood, posts, poles, and lumber for its future needs.

Studies of the Michigan Conservation Department show that in the experience of 5,000 anglers it took an hour to catch a fish in the open streams, while it took only three-quarters of an hour to catch a fish in water that had been planted. Fishing is a form of recreation that nearly every one enjoys, but an hour is too long to catch a fish unless it is a big one. The county plan should see that fishing is more remunerative.

The Pennsylvania State Park System estimates that the wild game of the state is worth as much as its live stock. The forests and parks of the county should be game preserves also to replenish the country lying about them.

Parks and the County Recreation Plan

All the areas mentioned would have important recreation uses, even though the ostensible purpose were to raise trees. The forest area is suited for camping, nature study, nature trails, and the observation of animals and birds where they are tame and unafraid.

Forest and game land may well be off the main highways and need not be near centers of population. On the other hand, park areas need to be accessible. They should include places of scenic and historic interest, points of observation, lakeside and riverside stretches, fine bits of forest and places of local interest. Forests and game preserves should be in blocks of several thousand acres, while parks should seek to make waterside places available in all parts of the county, and may be satisfied with hundreds.

So far as possible, all populous counties should provide bathing places, within two miles of everybody. Bathing is the most popular sport in summer. At most bathing places there should be provision also for boating, and skating in winter.

Near main highways, and preferably at the community school, there should be facilities for baseball, basket-ball, and tennis with golf grounds as needed. Either at the school or at the edge of some of the forests, there should be picnic groves with fireplaces, tables, drinking water, and a children's playground; also sanitary conveniences.

There should be one or more places on the edge of wooded lakes where school and playground children could go for two or three weeks for summer camping. There should be permanent buildings, with a good-sized garden, a cow or two and some chickens, for the sake of the products and because of their interest to the children.

Week-end camps have proved exceedingly popular for college students, as have the family week-end camps of the Playground Department of Los Angeles. If there is a good-sized city in the county, there should be at least two such camps, one for men and one for women. Teachers usually appreciate such facilities wherever they are furnished.

In order to make its recreation features accessible, every county should issue a directory, listing its resorts, parks, forests, game preserves, lakes, rivers, golf courses, tennis courts, baseball fields, and other points of interest. Michigan's tourist trade is estimated to be worth more than a hundred million dollars annually. The county may well aim to keep its own pleasure seekers at home and at the same time bid for outside patronage. A plan will help.

In order to carry out such a system of recreation, every county should have a recreation office and a director, whose business it should be to get out the recreation directory and see that these recreation facilities are utilized.

Snow Removal in Cities— Checking Contractors' Loads

New System Installed Last Winter in New York City Simplified Accounting and Eliminated Errors

THE Department of Sanitation of New York City prior to the winter of 1933-34 contracted for the removal of snow from the city streets in all five boroughs. The contract stipulated that city employees should pile the snow and the contractor should load the snow to a truck and dump it in one of 399 indicated places designated as dumps. These are usually along the river banks or openings into sewers. In addition, the city maintained 48 measuring stations for the purpose of measuring the cubic-yard capacity of each truck before it went into operation, where a specific number was supplied for each truck for the duration of any one storm.

The city also maintained loading foremen throughout the city for the purpose of supervising the loading of contractors' trucks, and a dump foreman at each of the 399 dumps to supervise the dumping of the contractors' trucks. Contractors for the removal of snow are paid by the number of cubic yards of snow actually dumped.

Manipulation and Errors in Old Method

The system in operation in past years consisted of a complicated punched ticket method which consumed a considerable amount of time of city employees who acted as measuring, loading and dump foremen. At the same time, opportunities for errors and for possible manipulation of the number of cubic yards of snow dumped were great. Further, because of the awkward punch ticket system, it was impossible to tabulate the cost of snow removal for any one district or for all districts for any particular storm until many days or even weeks after the storm. In addition, the detail required in the tabulating of the punched tickets necessitated a whole department and many clerks in the central office of the Department of Sanitation.

The New Method of Checking

A completely new method of checking throughout was installed, which resulted in many savings and greatly expedited the work. At the beginning of each storm on which the Weather Bureau reported that the snowfall would be sufficient to necessitate removal, the Department of Sanitation sent one 500-D Addressograph to each of the 399 dumps, another similar Addressograph and a Graphotype to each of the 48 measuring stations, along with a supply of top section blank plates and bottom section plates pre-embossed with the district and gang numbers. All these machines were returned to the central office immediately after the expiration of the storm, to await re-assignment during the next storm.

Each loading foreman was given a ring of 450 folio section D plates, pre-embossed in consecutive order from 1 to 450. These plates had a small hole punched in them for insertion on a ring. Each dump foreman was also given a blank ring to insert the plates as given to him by the truck drivers. Each of the three divisions of Foremen, Dump, Loading and Measuring, was also given a supply of the various forms to be used in recording snow removal. All of these were printed in the central office of the Department of Sanitation on a Multilith.

Trucks Went to the Measuring Foreman First

As each contractor's truck reported for work in the morning, it went to the measuring station covering the particular district in which the truck was to work during the storm. The measuring foreman measured the truck body with a special yardstick, which gave fractions of yards in tenths, securing the three dimensions necessary to compute the cubic-yard content of the truck. As he found those dimensions, he called them out to his clerk, who entered the figures on a capacity certificate in quadruplicate. Directly following, the figures were computed and checked, and the clerk embossed on a top section D plate the vehicle number, such as "8-105," the "8" designating the particular district in which the truck was to work and the "105" a consecutive number, one for each truck. At the same time, he embossed on the extreme right of the top section D plate, the cubic-yard capacity of the truck as shown on the report which was just completed, such as "10.40."

The District Superintendent, or his representative, assigned to each of the measuring stations, then inserted the bottom section D plate, which had been pre-embossed with the district and gang numbers, such as "8 1." The "8" denoted district 8, and the "1" designated gang 1. This assignment of vehicles to gangs and districts had been previously scheduled by the Bureau of Final Disposition Snow Unit.

The next operation at the measuring station was the imprinting of the plate, which now included the top and bottom section of the D plate, including the vehicle number and cubic-yard content of the truck on the top section, and the district and gang numbers on the bottom section of the plate. This was inserted in the Model 500 Addressograph, and an index card was imprinted and inserted in the plate holder.

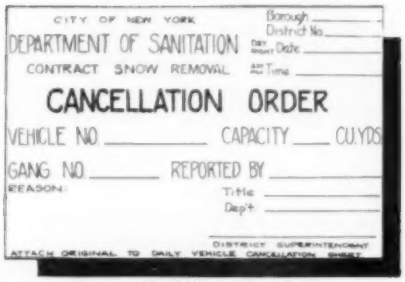
A large placard with a number corresponding to the number embossed on the plate was then tacked to the side of the truck for identification purposes. A plate holder and a copy of the capacity certificate was then given to the truck driver, and he was instructed to report to the proper district and gang as shown on the plate. The remaining copies of the capacity certificates were held until the end of the day and sent to the central office for checking and filing purposes.

Truck Reported to Loading Point After Measuring

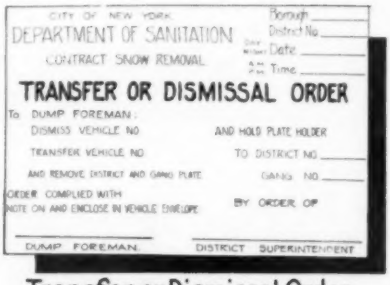
The contractor's truck then proceeded to the proper gang and district and reported to the foreman. The foreman, a city employee, took the plate holder from the driver and examined the truck number on the plate holder to see whether it agreed with the placard on the truck. If it did, he instructed the truck driver to load the truck with snow.

While the truck driver was loading his truck, the loading

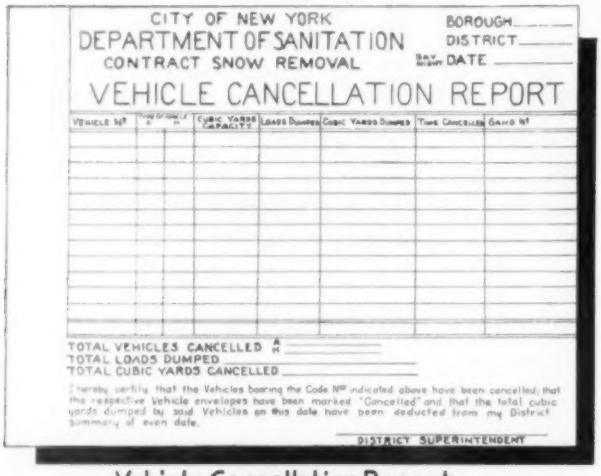
FORMS USED IN CHECKING AND REPORTING REMOVAL OF SNOW BY CONTRACTORS' TRUCKS


CITY OF NEW YORK
DEPARTMENT OF SANITATION
CONTRACT SNOW REMOVAL
CANCELLATION ORDER
VEHICLE NO. _____ CAPACITY ____ CU.YDS.
GANG NO. _____ REPORTED BY _____
REASON:
Title
Dept.
DISTRICT SUPERINTENDENT
ATTACH ORIGINAL TO DAILY VEHICLE CANCELLATION SHEET

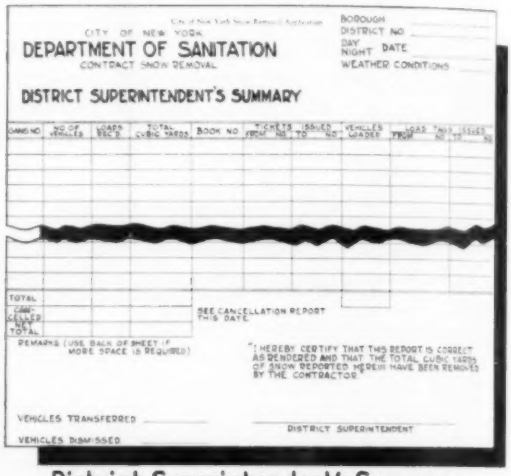
Cancellation Order


CITY OF NEW YORK
DEPARTMENT OF SANITATION
CONTRACT SNOW REMOVAL
TRANSFER OR DISMISSAL ORDER
To DUMP FOREMAN:
DISMISS VEHICLE NO.
AND HOLD PLATE HOLDER
TRANSFER VEHICLE NO.
TO DISTRICT NO.
AND REMOVE DISTRICT AND GANG PLATE
GANG NO.
ORDER COMPLIED WITH
NOTE ON AND ENCLOSE IN VEHICLE ENVELOPE
BY ORDER OF
DUMP FOREMAN
DISTRICT SUPERINTENDENT

Transfer or Dismissal Order


CITY OF NEW YORK
DEPARTMENT OF SANITATION
CONTRACT SNOW REMOVAL
VEHICLE CANCELLATION REPORT
BOROUGH
DISTRICT
DAY
DATE
VEHICLE NO. | TIME CANCELLED | CUBIC YARDS CAPACITY | LOADS DUMPED | CUBIC YARDS DUMPED | TIME CANCELLED | GANG NO.
TOTAL VEHICLES CANCELLED
TOTAL LOADS DUMPED
TOTAL CUBIC YARDS CANCELLED
I hereby certify that the Vehicles bearing the Code No. indicated above have been cancelled; that the respective Vehicle envelopes have been marked "Cancelled" and that the total cubic yards dumped by said Vehicles on this date have been deducted from my District summary of even date.
DISTRICT SUPERINTENDENT

Vehicle Cancellation Report


CITY OF NEW YORK
DEPARTMENT OF SANITATION
CONTRACT SNOW REMOVAL
DISTRICT SUPERINTENDENT'S SUMMARY
BOROUGH
DISTRICT NO.
DAY
NIGHT DATE
WEATHER CONDITIONS
GANG NO. | NO. OF VEHICLES | LOADS DUMPED | TOTAL CUBIC YARDS | BOOK NO. | TICKETS ISSUED FROM NO. | TO NO. | VEHICLES CANCELLED NO. | VEHICLES LOADED | LOAD TAGS USED FROM NO. | TO NO. | LOADS DUMPED NO.
TOTAL
CANCELLED TOTAL
SEE CANCELLATION REPORT THIS DATE
REMARKS (USE BACK OF SHEET IF MORE SPACE IS REQUIRED)
"I HEREBY CERTIFY THAT THIS REPORT IS CORRECT AS RENDERED AND THAT THE TOTAL CUBIC YARDS OF SNOW REPORTED HEREIN HAVE BEEN REMOVED BY THE CONTRACTOR."
VEHICLES TRANSFERRED
VEHICLES DISMISSED
DISTRICT SUPERINTENDENT

District Superintendent's Summary

CANCELLATION ON DISTRICT SUPERINTENDENT'S SUMMARY REPORTS

foreman took the next load number folio D plate from the ring and inserted it into the plate holder, thereby completing the unit or plate holder with three sections of D plate. At the same time the loading foreman entered the vehicle number on his blotter sheet. The load number, being in consecutive order, had already been printed on the blotter. When the truck reported to the foreman with a full load, the foreman examined the load to see that it was up to specifications, and if so, gave the plate holder to the truck driver, instructing him to report to the dump, and then entered the time of departure of the truck on his blotter sheet.

Dump Foreman Checked Trucks Before Unloading

On arrival at the dump, the dump foreman, another city employee, took the plate holder from the truck driver, examined the load of snow to see that it was up to specifications, with no side-boards removed, etc., noted the vehicle number, gang and district number on the plate and checked the vehicle number with the placard on the trucks. If they all agreed, he instructed the driver to dump the snow.

While the driver was unloading the snow, the dump foreman imprinted a vehicle envelope for the first load of each different truck. The envelope had a complete impression from the plate on the front, and a column for the insertion of load numbers for that particular truck. The dump foreman took a bound book made up of a series of snow-removal tickets which had been pre-numbered in triplicate. He imprinted on each of the three tickets the next consecutive number using the plate, at the same time filling in the date, and the arrival time of the truck, and initialing the ticket. The first copy of this ticket went into the vehicle envelope for that particular truck. The second copy went into a dump report envelope, which at the end of the day contained one ticket for each load of every truck dumped. He retained the third copy until the truck was dumped.

After the ticket impressions had been made from the plate, the dump foreman took the load plate folio section from the D plate and inserted it in the ring for that purpose.

Truck Driver Given Receipt for Each Load

When the truck had been completely dumped, the dump foreman gave the third copy of the imprinted serially numbered ticket to the driver as his receipt for that particular load. H also gave the plate holder, which had had the folio section containing the load number for that load removed, to the driver and instructed him to return to the loading station.

The dump foreman's next operation was to enter on his blotter sheet, which had been pre-printed with numbers to correspond with the tickets he had in bound form, the vehicle number, cubic-yard content, load tag number and time of arrival of that particular truck. This gives a complete outline of the operation of each truck according to this control plan.

Irregularities Canceled Load Credits

In the event that a truck did not follow through in the proper manner and reported to either the loading or dump

foreman with the side-boards off or some other irregularity, a cancellation order was made out for that particular truck, and if it was noted that the truck driver had deliberately performed a violation of the rules set up in the contract made by the city, that particular truck lost credit for all loads made up to that period. At the same time, the foreman confiscated the offending truck driver's plate.

The District Superintendent was the only person allowed to sign a cancellation order, so if a loading or dump foreman found a truck violating the rules, he made out a cancellation order, and when the District Superintendent visited his loading station or dump, he explained the circumstances and had him sign the cancellation order, putting it with the confiscated plate in that particular truck's vehicle envelope for the day. The District Superintendent also made a record of the cancellation and reported it in his vehicle cancellation report, so that there was a double check at the central office on all canceled trucks.

Truck Transfers Also Under Control

A similar control was also set up to take care of the transfer of a truck from one district to another, in case one district had extra trucks and another district was lacking in trucks. A transfer order was made out, the truck was transferred and this information reported on the blotter sheets of the foremen so as to balance their reports at the end of the day.

At the end of each day's work, the measuring station foreman sent in his capacity reports to the District Superintendent for that particular district. He also returned the unused plates and district and gang plates which had been given to him in the morning.

The loading foreman totaled his blotter sheet and sent it with his unused load plates and ring to the District Superintendent's office. The dump foreman totaled his blotter sheet, his dump report envelope and vehicle envelope, seeing that the totals agreed with the number of folio load plates on his ring and with the tickets taken from his bound book. The totaling of the dump report envelope gave him the total number of cubic yards of snow dumped in his dump, and also the number of loads dumped. The totaling of the vehicle envelopes gave the number of loads hauled by each individual truck, and the number of cubic yards dumped by each truck. The total figure on the dump report envelope naturally had to agree with the total figure on his blotter sheet. These reports, with the load plate ring, were sent in to the District Superintendent's office for that district, and all the reports for the district were assembled in a District Superintendent's summary, checking all the individual reports for errors, and sending them into the central snow office.

The Work of the Central Snow Office

From the reports received from the District Superintendents, the central snow office was able easily to figure the cost of snow removal in each district, by tabulating the total figures on the blotter sheet from that district, or from the dump report envelope for spot checking, and by totaling the figures from each District Superintendent's report, thus securing a total cost of snow removal for the day.

A truck driver never collected any money from the city for snow dumped unless he had a copy of the ticket given him by the dump foreman, with a complete impression of the plate on it. Should he represent a canceled truck and have some tickets for loads dumped prior to cancellation, these tickets were automatically voided at the central office, and he could not collect any money. This point was most important, because it eliminated many of the legal claims the city has had with its former method of checking loads of snow dumped.

Further precautions were taken by the Department of Sanitation against any possibility of collusion between their own employees, by giving the District Superintendent the authority to rotate the loading foremen every hour or two, so that at no time during the day would the measuring foreman, the dump foreman and the truck driver know who would be the loading foreman for the next load of that particular truck. In this way, any attempt at manipulation of the records was made quite impossible.

Raising Standards of Police

CITIES can now determine how the general ability of their police force compares with a national standard by using a newly designed police adaptability test.

The test, made up by the United States Civil Service Commission at the request of the International Association of Chiefs of Police, is devised to improve police personnel, and eventually to set up a national standard of attainment. Public Administration Service, Chicago, is making the test-forms available to all cities in the country.

Eight cities are already giving their police officers the test, which is based as far as possible upon practical knowledge and ability to analyze and solve police problems. The cities are Berkeley, Calif., Mason City, Iowa, Wichita, Kans., Lansing, Mich., Salt Lake City, Utah, Norfolk, Va., Seattle, Wash., and Kenosha, Wis.

"Experience on a police force may enable men to perform police duties more effectively than could new men with higher intelligence," says Dr. L. J. O'Rourke, Director of Research of the U. S. Civil Service Commission, who designed the test. "For this reason, it must not be assumed that experienced men on the force should be dropped because their intelligence ratings are somewhat below the entrance requirements set up through the test.

"Men on the force are to be thought of in terms of their efficiency rather than in terms of their test scores. In the initial selection of police recruits, however, test scores are the only satisfactory basis for determining their capacities.

"Raising entrance standards will eliminate some men who would make good policemen, it is true. But the main problem is to insure increased efficiency in the force as a whole. Below a certain degree of adaptability, men as a group will not profit by experience, as will men of higher adaptability."

The police adaptability test has been tried out successfully in sample cities. In Washington, D. C., all policemen who attained top quarter ranking in the test had also rated above average in police training school. Of those scoring in the lowest quarter, none was rated above average in the police school.

Have You a Hobby?

AMONG the fifty prominent people who have described their hobbies in the anthology, "Hobbies for Everybody," published by Harper & Brothers, are many well-known officials of civic and national organizations, among them: William Hodson, Commissioner of Public Welfare of New York; Harry Lydenberg, Assistant Director of the New York Public Library; Dr. Frederick N. Robinson, President of the College of the City of New York; Theodore Acland Harper, camping authority from the National Board of the Camp Fire Girls of America; Louis B. Hebert, Arts and Crafts Director of the West Side Y.M.C.A. (New York) and of the McBurney Schools for Boys; John T. Winterich, Editor of the *American Legion Monthly;* and Horace R. Bigelow, librarian of the New York Athletic Club; also Albert Payson Terhune, and Don Marquis. This comprehensive book is the outgrowth of a radio series on hobbies arranged by its editor, Ruth Lampland, for the Y.M.C.A.'s of the United States, while she was a radio director of the Y.M.C.A. of New York, and is of value to teachers, club officials, directors of recreation, camp directors, counselors, and others.

The Sewage Treatment Plant at Carlisle, Pennsylvania

By ELTON D. WALKER, M. Am. Soc. C. E.
Consulting Engineer, State College, Pennsylvania

THE borough of Carlisle, Pa., has a sewage treatment plant which was constructed over twenty years ago from plans prepared by the late T. Chalkley Hatton. The plant consists of bar screens, two septic tanks, three primary and three secondary contact beds, and a sludge drying bed. Because of increased sewage flow, the plant has been seriously overloaded for some time, with a resulting poor efficiency of operation.

The writer was retained to prepare plans for a new plant, which is being built by the borough by day labor under the direct supervision of George P. Searight, Borough Manager. The work is financed by bonds floated by the borough and a PWA grant.

The new plant, shown in outline on the accompanying sketch, will include bar screens, a screenings digester, preliminary sedimentation basins, separate sludge digestion tanks with Downes floating covers, glass-covered drying beds, a control house and laboratory, trickling filters with rotary distributors, a disinfection house, and a resettling basin. In designing the new plant the available head, if pumping of sewage was not to be employed, restricted the choice of methods somewhat, because the difference in level between the inverts of the influent and effluent sewers is a little over 10 feet and it seemed impracticable to change either. The plant is designed for a population of about 17,100 and an average sewage flow of 1,460,000 gallons a day, which it is estimated will be reached in 1960. In 1930 there was a population of about 12,100 contributing to the sewers, giving an average flow of a little over a million gallons a day. Gagings made in 1930 showed a maximum flow of short duration, about sixty per cent above the average.

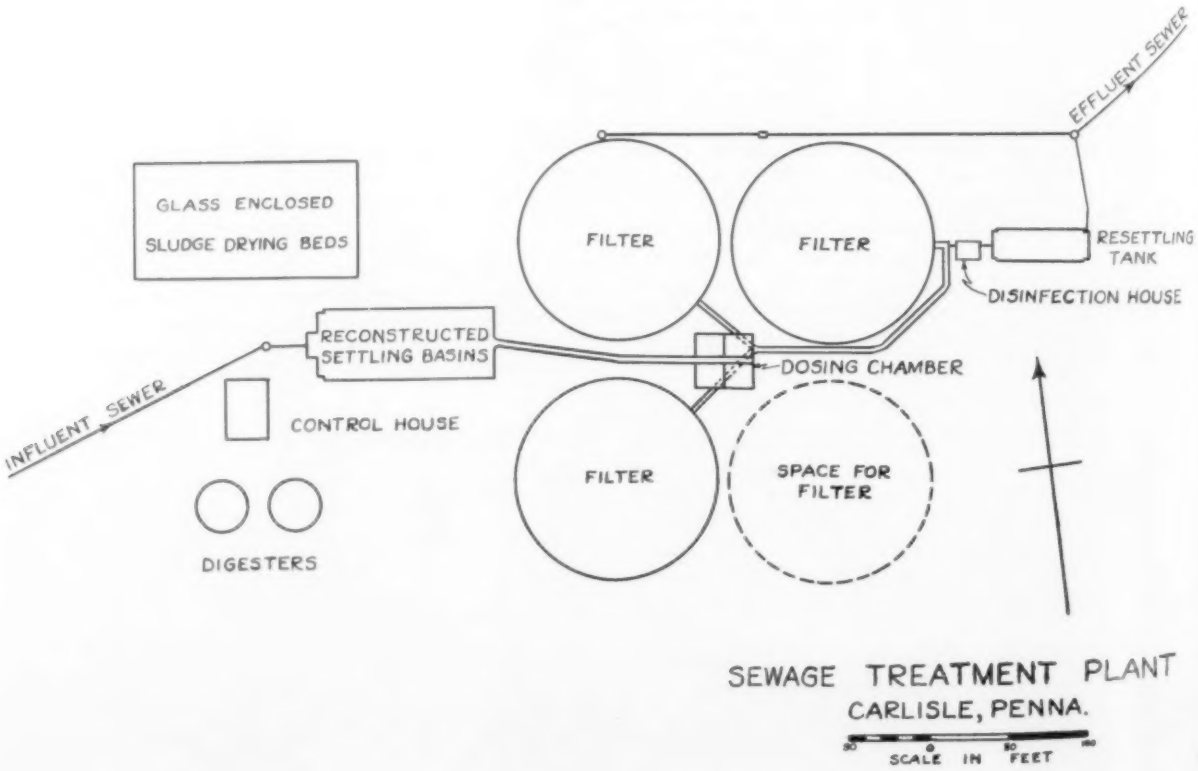
Bar Screen and Screenings Digester

The present rack will be replaced by one with a clearance of 1 inch betwen bars which will provide a net area of 15 square feet for the flow of sewage under average conditions. The present bars have a closer spacing and retain a considerable amount of fecal matter.

A screenings digester manufactured by the Pacific Flush-Tank Co. will be installed in the control house. This digester will have an estimated maximum capacity of 55 pounds a day, dry basis, or about 5 cubic feet.

Preliminary Sedimentation Basins

The existing septic tanks will be remodeled by removing the existing baffles and installing new ones, strengthening the side and intermediate walls, constructing sludge hop-



pers at the entrance ends, and installing scum troughs and Link-Belt straight line sludge collectors. Each of the remodeled tanks will be 100 feet long, 18 feet 4½ inches wide, and about 8 feet deep. This will give a theoretical detention period of about 3.6 hours.

Separate Sludge Digestion Tanks

The sludge from the preliminary sedimentation tanks and from the secondary tank will be pumped to two separate digestion tanks with Downes floating covers. The floating covers are to be provided with roofs of yellow pine, Celotex, and tarred felt. An innovation is provided in these covers in that the cylindrical surfaces are to be insulated with Celotex. This is expected to materially reduce the heat loss through the covers and make it easier to maintain the temperatures desired for sludge digestion. As the soil at the site is clayey, the fill around the tanks will include an 18-inch thickness of cinders, drained to prevent accumulation of ground water, to serve as insulation for the concrete walls. The covers will be of the new type with stationary gas outlets. The sludge in each tank will be heated by hot water circulating through five coils of 2-inch genuine wrought iron pipe supported 18 inches to 3½ feet inside the concrete walls and extending to a height of 5 feet above the bottom of the cylindrical walls. These tanks will be 30 feet average diameter and 21½ feet deep below the flow line at the sides. The center depth below the flow line will be 25½ feet. Openings are provided in the floating covers for sampling, and provision is made for the installation of indicating and recording thermometers.

Sludge Drying Beds

Glass-covered sludge drying beds are provided having a net area of approximately 9,580 square feet, or about 0.56 square feet per capita of the estimated population in 1960. The dried sludge will be removed from the beds by shoveling into a bucket suspended from a monorail. The sludge can be dumped from the conveyor bucket into a truck or on the ground outside the beds. The glass covers and monorail equipment are furnished by the Lord and Burnham Co.

Control House

The control house will contain the screenings digester, a laboratory equipped for making the determinations necessary for control of operation, a liming machine for conditioning the sludge when necessary, an Ames duplex plunger pump for pumping sludge, a centrifugal pump to use as a standby and also for dewatering the primary tanks and other miscellaneous uses, two boilers—one gas-fired and the other coal-fired—for heating the circulating water for the digesters and for heating the building, circulating pumps on the heating lines for the digesters, and the necessary piping, gas meters, water meters, and other appurtenances for controlling operation.

Provision is also made for sampling the sludge as it is being pumped.

Control Chamber

In the control chamber between the digestion tanks, the piping is arranged so that the contents may be drawn at various levels, and provision is also made for taking samples as the contents are withdrawn. Two recording depth gages are located here and these will give check readings of the addition of sludge and of the withdrawal of sludge or supernatant liquor. These are equipped with an electrical alarm device which will ring a bell in the pump room when the floating covers come within 6 inches of their upper or lower limits so as to warn the operator against pumping sludge into a tank that is nearly full without first removing supernatant liquor or digested sludge, and so that too much sludge or liquid may not be removed, with the consequent danger of drawing air into the tanks.

Trickling Filters

Three trickling filters will be constructed with PFT rotary distributors. Each filter will be 120 feet in diameter with an average depth of 5 feet 8 inches. This provides a design load of 3,860 persons, or 330,000 gallons, per acre-foot. The sewage will be conveyed from the primary settling tanks to the siphon chambers of the filters through a reinforced concrete trough supported on piers. This arrangement gives a very small loss of head and makes it easy to remove any sediment that may collect. The flow to each siphon will be controlled by an adjustable bronze weir and the combined flow will be recorded on a Simplex recording weir gage.

The stone in the filter will be a hard limestone of such size that it will pass a 2½-inch screen and be retained on a 1-inch screen. The underdrains will be of slotted tile bedded in concrete.

Disinfection House

From the trickling filters the sewage will pass through open concrete channels to the disinfection house, where it will be dosed with chlorine, and will then pass to the resettling basin. The disinfection house, in addition to a Wallace and Tiernan chlorinator, will contain an Ames simplex plunger pump to pump sludge from the resettling basin to the sludge digestion tanks.

Resettling Basin

The resettling basin for retaining the solids from the trickling filters is to be 55 feet long, 18 feet 4½ inches wide, and 8 feet deep, giving a theoretical detention of one hour. This basin will have hoppers at the entrance end and will be equipped with a Link-Belt straight line sludge collector. From here the sewage will pass to the existing effluent sewer and thence to Letort Spring Creek.

A grit chamber has not been provided for in the plans, because operating experience with the existing plant indicates that this is unnecessary. If one should be needed later because of changed conditions, ample space exists for its installation on the influent sewer line.

In case the population should increase at a greater rate than is estimated, space is available for a fourth trickling filter, and the primary sedimentation basins can take care of a greater amount of sewage than is estimated without greatly reducing the efficiency of sedimentation. The existing sewers are on the separate system and carry some industrial waste.

The plant will be put in operation this fall.

Quote freely from
THE AMERICAN CITY
and please give credit
when so doing.

FORWARD STEPS

Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

Demonstrated Value of Long-Range Planning

READING, PA.—That definite, long-range planning of civic improvements is a tremendous asset to any community has been demonstrated by Reading's experience. As an instance of immediate importance, planning in the city and suburbs, undertaken on an intensive basis during the last four years, enabled the county in which Reading is located to absorb nearly twice its quota of CWA workers during the current year, many of these men being given employment on a park project which had been laid out only two years before that time.

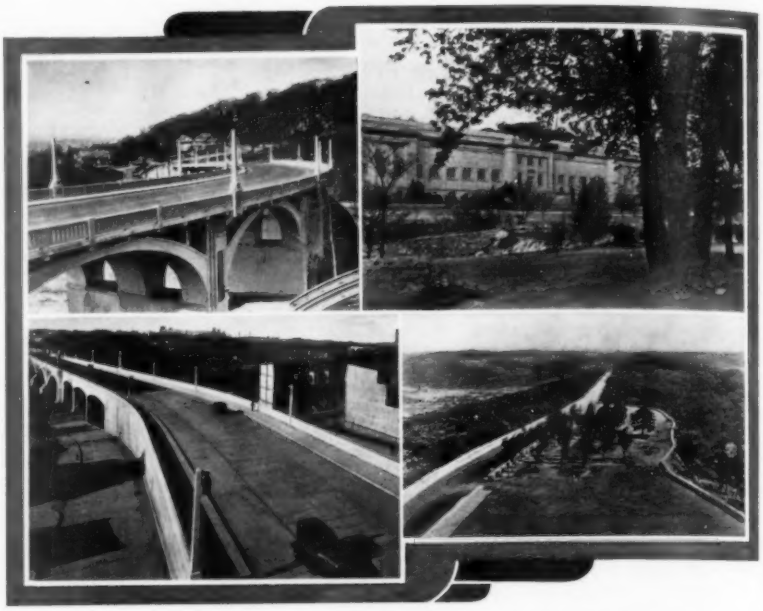
In 1923, a Chamber of Commerce committee, after many months of study, submitted 22 recommendations for projects of civic importance to be undertaken by the city and county during the next 25 years following. The proposals were:

1. Combined courthouse and city hall
2. Elimination of grade crossings
3. Acquisition of side of mountain adjoining city
4. Finish street-paving program
5. Complete sewage system
6. Needed school buildings, including museum and art gallery
7. Expand water system
8. More park and play areas
9. Second mountain boulevard
10. Purchase slope of second mountain
11. Public ball grounds and tennis courts
12. Convention hall
13. Public bathhouses
14. Extend high-pressure water system
15. Removal of unneeded poles and wires
16. Alley paving
17. Building code
18. Riverfront improvement
19. Build fourth river bridge
20. Improve highway entrances to city
21. Cooperate with suburbs
22. A circumferential boulevard

And now, within eleven years, the record shows that twelve of the twenty-two proposals have been completed in full; five have been accomplished in part; only three have remained untouched entirely, and these have been offset by far greater extensions in the completed proposals than originally had been contemplated.

Here is the record of accomplishment:

Both city and county governments housed in modern structures, although the combined city hall and courthouse was not achieved; mountain land acquired, on both slopes, far in excess of original proposal; main traffic arteries paved; sewage system completed; needed school buildings erected, with museum and art gallery; water system expanded to meet needs of next fifty years; park and play areas extended to above national average; public ball grounds and tennis courts provided; one public bathhouse erected, and others being planned; high-pressure water system extended throughout business district; unneeded poles and wires placed underground; rotary fund established for alley paving; building code approved and adopted; fourth river bridge constructed; highway entrances improved; and cooperation with suburbs, to handle major planning problems, established through formation of a Community Council, for which John Nolen acted as Consultant Engineer.



VIEWS OF PUBLIC WORKS ACCOMPLISHMENTS IN READING, PA.
Upper left, Lindbergh Viaduct; upper right, Museum and Art Gallery; lower left, Buttonwood Street Bridge; lower right, Skyline Boulevard, part of Mt. Penn Park Development

Progress has been made in most of the uncompleted proposals. Grade-crossing removal has been postponed, because of the expense involved, although adequate plans were submitted; the purchase of the second mountainside and construction of a boulevard has been totally neglected, although the new parkway system on the nearest mountain is much more extensive than had been contemplated; the convention hall was not built, and the experience of many other cities indicates the wisdom of postponement in this case; plans for riverfront improvement have been made, but delayed because the stream, choked with anthracite silt and culm, must be treated from a regional standpoint; and, lastly, several links of the circumferential boulevard, at about three miles distance from the city, have been constructed.

Here is a direct demonstration of how needed civic improvements can be planned far in advance of their actual need, in the anticipation of an occasion arising that will make the realization of these projects possible.

Originally intended as a twenty-five-year program, the great majority of the projects have been accomplished within eleven years. The very fact that the depression years brought about a great deal of "made" work helped, for the labor so provided led to the development of the magnificent park and parkway system, the expansion of playground facilities, and highway improvement.

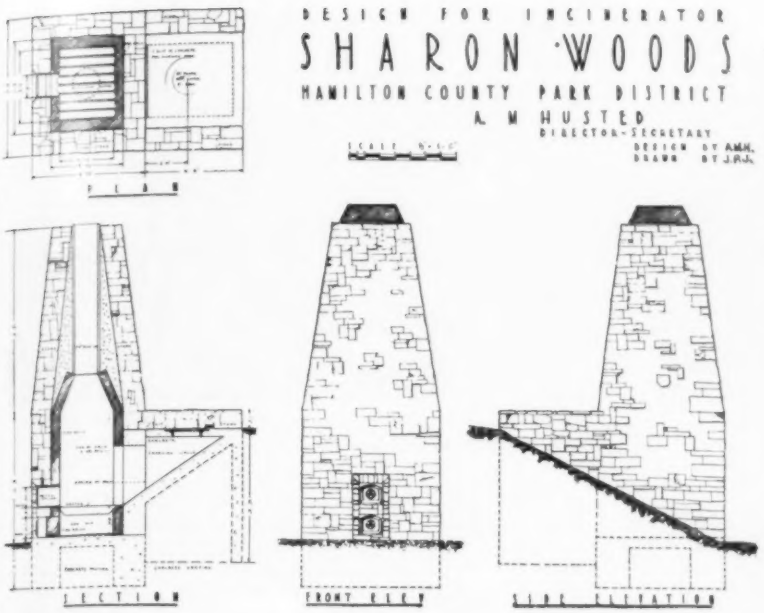
Of course, the original list failed to incorporate a number of proposals which would be demanded today. In 1923, there was no widespread clamor for public golf courses, nor for airports. These and other improvements are suggestions of more recent years, showing the necessity for adopting programs of civic development which are at once comprehensive and flexible.

I. T. TYSON,
President, The Chamber of Commerce of Reading, Pa.

Park Incinerator Burns Picnickers' Garbage Successfully

CINCINNATI, OHIO.—The old saying, "Necessity is the mother of invention," often applies to park development and some of the problems connected with it. The Board of Park Commissioners of the Hamilton County Park District was faced with the problem of disposing of the garbage in Sharon Woods, the first park of a proposed system about metropolitan Cincinnati.

Sharon Woods has become a popular picnic area, with an average weekly attendance of between 15,000 and 20,000 picnickers. There resulted quite a problem relative to the disposal of garbage



and waste. The first year an attempt was made to dispose of garbage by burning it in a pit. This method, however, was not particularly successful, for the garbage burned slowly and the smoke and odors remained close to the ground, to which the neighboring residents objected. An efficient incinerator seemed to be the logical solution, yet the manufactured incinerators were rather too high in price.

In the face of these problems, it was decided to plan and build our own incinerators, as shown in the accompanying drawing and photograph. We thought it advisable to adopt a design similar to that of the private home incinerator, but on a much larger scale. A set of old furnace grates was used for the grate. These, being standard design, could easily be replaced. Standard make furnace doors were used for fire-box and clean-out doors. Since the garbage to be disposed of consisted of several truck loads per day, it was essential that an easy means of charging be provided. This was done by building up a truck ramp several feet above the grate elevation, as shown on the accompanying drawing. The floor of the charging compartment was sloped toward the grate, and an ordinary coal hole served as a charging door. Native stone was used in order to present an acceptable appearance. The whole construction was completed with unemployed labor furnished by the Welfare Department. The cost of the materials used amounted to $435.

The incinerator was built within 50 feet of a gas line that passes through the park, so that in case there was any difficulty in burning the garbage, gas burners could easily be installed. In six months of operation no difficulty has been encountered in burning any of the garbage, for there is always an abundance of paper, which makes it readily combustible. There was some fear that during the melon season there would be trouble in burning the abundance of rinds. The incinerator has worked so successfully, however, that even rain-soaked garbage and paper have burned readily. Thanks to the chimney, no objectionable odors have ever been noticed.

Such an incinerator can easily be built anywhere, since all metal parts are standard foundry castings. The capacity is sufficient for small villages as well as large parks.

A. M. HUSTED,
Director, Hamilton County Park District.

Long-Distance Visibility for Welcome Signs

QUINCY, MASS.—A striking use of city streets for welcoming tourists and strangers has been developed by the Retail Merchants Bureau of the Quincy Chamber of Commerce. Welcome signs are painted on the nine principal highways entering the city, and direct visitors to the retail centers.

The distinctive feature of the sign is its visibility at a distance secured by the use of the principles of distortion worked out by the Eno Traffic Foundation and Prof. C. J. Tilden of Yale University. By making the letters 10 feet long and 14 inches wide, thickening the horizontal strokes and narrowing the vertical strokes, it has been made possible for autoists to read the signs perfectly as far as 200 feet away.

A READABLE WELCOME

The signs were made more visible by night and in all weather conditions by the use of special paint developed by the Norfolk Paint and Varnish Co., Quincy, Mass. They do not constitute a traffic hazard, because they are directly on the road, where the vision of autoists should be, and they have worked out most satisfactorily. It has been found necessary to repaint, at small cost, every three months.

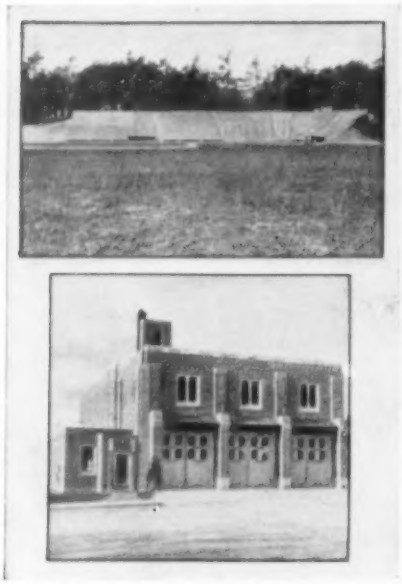
GEORGE F. HINES,
Secretary, Quincy Chamber of Commerce.

Long-Term Financial Planning

TWO RIVERS, WIS.—The city of Two Rivers expects to be free from bonded debt in about fifteen years. This application of long-term financial planning will be brought about as a result of the look ahead here outlined.

In August, 1930, after two years as City Manager of Two Rivers, I had a good idea of what the citizens wanted in capital outlay and permanent structures. At that time I made a chart showing for each bond issue what amount of bonds and interest would be paid off each year. This amounted to about $58,000 annually at the start, and extended to 1950, at which time all the bonds already issued would be paid off, the amount of money necessary being less each year.

A list of all permanent improvements which I thought would be built within the next fifteen years was then made, with their estimated cost, and this statement was sent to each of the nine Councilmen. From a questionnaire and from



PLANNED IMPROVEMENTS IN TWO RIVERS, WIS.
At top, Thomas Walsh Memorial Baseball Park bleachers; below, fire station, completed 1934

HAMILTON COMMUNITY HOUSE, TWO RIVERS, WIS.
Gift of J. E. Hamilton; Childs & Smith, Chicago, architects

talking with each of the Councilmen, I secured their ideas as to when each of these permanent improvements should be built, and what other improvements they had in mind. Then by talking this over with other citizens, members of the Council, the School Board, and other boards of the city, an outline of what improvements should be built in the next fifteen years—and when—was set up.

The cost of the new improvements to be built was added to the chart of the bonds already issued, so that the bond and interest payments for both the old bonds and the new improvements would equal $58,000 a year for the next fifteen years. In that way our bond and interest payments would be covered by the same amount of taxes each year. All this was on the assumption that the assessed valuation and tax rate would remain the same. If the assessed valuation was increased, we should have an amount of money left over.

In addition, certain small structures were to be built, or paving laid, each year, amounting to a yearly average of about $40,000. These were to be paid for in cash without bond issues. Three years ago the site for the community building was purchased for $42,000; two years ago a fire station was built for $39,000; and a year ago the city paid its share of $40,000 for a state highway bridge.

For the last four years the program has been working out very close to the estimate. Owing to the PWA, the program has been slightly advanced, and we are constructing a filtration plant, an elevated storage tank and water mains this year instead of two years from now. On the present basis of work, and by keeping the tax rate at $25 per $1,000, and interest and principal payments the same as now, all our grade and high schools will be completed, we shall have built a city hall, a jail and police station, a fire station, intercepting sewers, a sewage disposal plant, a filtration plant, and an elevated water tank, and shall have practically all the streets paved, and all paid for by 1947. After that we hope to operate on a pay-as-you-go basis.

During six years, I have seen this plan work out well through a change of several City Councils.

E. J. DONNELLY,
City Manager.

Municipal Electric Plants Denied Right to Make Profit in New York State

THE old issue of home rule over municipal utilities was raised in a recent decision of the New York Public Service Commission. This Commission, one of the most able and progressive in the country, was called upon by consumers of the village-owned electric plant in Boonville, N. Y., to order lower rates, and under the Commission's power to regulate municipal electric plants it rendered a unanimous decision that such a plant is entitled to charge rates that will meet only the full cost of service. It said: "The purpose for which municipal corporations are created and governmental powers conferred upon them is in direct opposition to the theory that profits should be made out of their operation." The making of a profit which would go to reduce taxes or for other general municipal purposes was declared to be improper and to constitute "indirect and unfair taxation of consumers." Even a "profit" to the extent of a fair return on the investment is not permitted, although bond interest is allowed to be met out of the plant's earnings, where there are any bonds. The plant in question had none. The right to a return on the fair value of the plant was contended for by Dean Paul Shipman Andrews of Syracuse University, representing the state Municipal Utilities Association, which has a membership of twenty plants, and also by representatives of several villages individually.

Amortization of bonds, which was of course not involved in this particular case, was not definitely ruled on, and, it seems, might be permitted. As to taxes, the village was permitted to charge their full equivalent as if the plant were privately owned.

While the financial course mapped out by the Commission would ordinarily be desirable enough for a municipal plant to follow, it appears to THE AMERICAN CITY to be a matter which could very well be left for local determination; for if electric consumers feel overcharged in favor of taxpayers, they are certainly not helpless to correct it by a local protest, at the polls if necessary. Such being the case, the local voters and officials should not be precluded from permitting a municipal plant to expand through use of its earnings, or even, in times of local financial stress, from coming to the aid of the whole community.

While the New York Commission presumably had no alternative, under the law of that state, to exercising some measure of regulation in this case, their denial of any right to a return on the investment not represented by bonds seems extreme and unnecessary, particularly where service to consumers outside the municipality is involved. As one reason for such denial it was stated that to allow a return on the plant "value" would introduce "all the paraphernalia of reproduction cost and its numerous progeny"—a thoroughly understandable objection; but this would be avoided by use of the actual investment, rather than a reproduction-cost estimate, as the basis for such a return.

For a discussion of tax relief through municipal utilities, issued prior to the handing down of the above-mentioned decision of the Public Service Commission, see the Report of the New York State Commission for the Revision of the Tax Laws, transmitted to the Senate and Assembly of the State of New York, February 15, 1934.

TRAFFIC CONTROL AND FACILITATION

Conducted by Publications Committee, Institute of Traffic Engineers, 175 Fifth Ave., New York

Maxwell Halsey, Chairman, Harry Hemmings, Reyburn Hoffman, Benoit Laberge, Theodore T. McCroskey, Donald M. McNeil, A. J. Naquin, Hawley S. Simpson, Arthur G. Straetz, Peter J. Stupka, Lawrence S. Tuttle, John C. Wrighton

Highway Safety Enhances Attractiveness

HOW to preserve and enhance road scenery and the cost of doing it are described in working detail by Wilbur H. Simonson and R. E. Royall in a recent brochure* issued by the Bureau of Public Roads. Tucked away on the accompanying drawing is this keynote observation: "It is axiomatic that the principles of safety and of good appearance are inseparable. Every scientific effort made by the highway engineer to improve traffic safety usually effects an equal or comparable improvement in the appearance of the highway."

The purpose of the drawing is to show how the flaring of ends of guard-rails improves appearance and increases safety. The flares expose to the driver's view three or four times as much surface as a straight fence does, and make him feel more secure.

The top sketch shows a flared rail of seven sections across a culvert, and how it looks to the driver of the vehicle at the extreme right. Short rails like this one should have an odd number of sections so that the middle one can be centered across the structure. The last three end sections are flared.

The landscaping consists not only of placing trees, grass and guard-rails, but also of making the new surfaces of cuts and fills flow into the natural ground contours with as little break in the grade as possible. A steep slope is unsightly and difficult to maintain, and requires a guard-rail, while a 4 on 1 slope does not, as shown in the sketch at the extreme left.

A particularly valuable chart accompanying the study shows the cost per mile of right-of-way of various widths and costs per acre, and the relation between cost of right-of-way and cost of construction of both low-type and high-type surfaces.

* See page 87, July, 1934, issue of THE AMERICAN CITY.

Program of the Fifth Annual Meeting, Institute of Traffic Engineers

PLANS have been made for a particularly interesting and important meeting of the Institute of Traffic Engineers, to be held at the Hotel Cleveland, Cleveland, Ohio, October 2 and 3, in connection with the annual convention of the National Safety Council. The Institute's program follows:

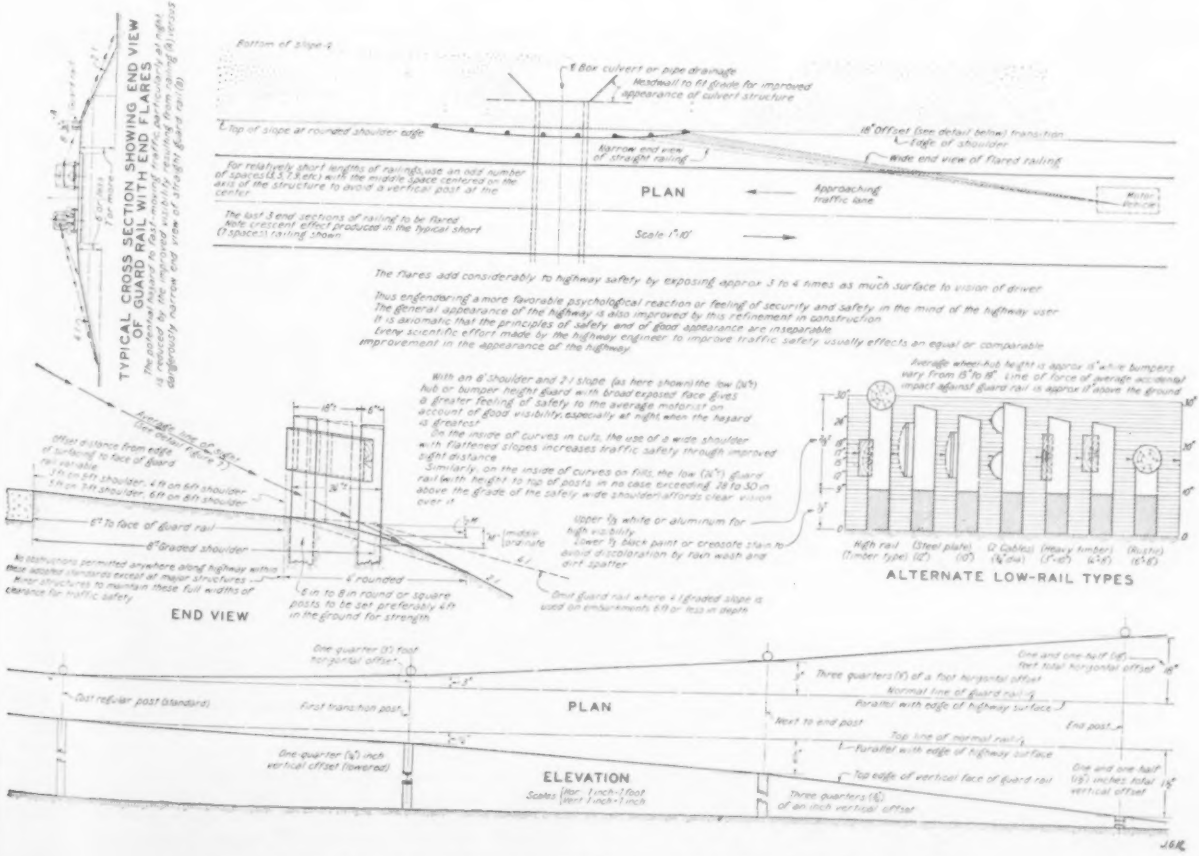
Morning Session, Tuesday, October 2

Chairman, Prof. Roger L. Morrison, Department of Highway Engineering and Highway Transport, University of Michigan.

Analysis of Pedestrian Accidents with Respect to Age, Time of Day, Mission of Pedestrian, etc.; W. A. Van Duzer, Director of Vehicles and Traffic, District of Columbia.

Discussion opened by Peter J. Stupka, Assistant Director, Traffic Surveys, Federal Emergency Relief Administration, and Reyburn Hoffmann, Secretary and Manager, St. Louis Safety Council.

Pedestrian Control by Signals; Edward H. Eames, Traffic Engineer, Automatic Signal Corporation, New York City.


TYPICAL CROSS SECTION SHOWING END VIEW OF GUARD RAIL WITH END FLARES
PLAN
ELEVATION
END VIEW
ALTERNATE LOW-RAIL TYPES
The flares add considerably to highway safety by exposing approx 3 to 4 times as much surface to vision of driver.
Thus engendering a more favorable psychological reaction or feeling of security and safety in the mind of the highway user.
The general appearance of the highway is also improved by this refinement in construction.
It is axiomatic that the principles of safety and of good appearance are inseparable.
Every scientific effort made by the highway engineer to improve traffic safety usually effects an equal or comparable improvement in the appearance of the highway.

FLARING OF ENDS OF GUARD-RAILS IMPROVES APPEARANCE AND INCREASES SAFETY

Discussion opened by Maxwell Halsey, Traffic Engineer, National Bureau of Casualty and Surety Underwriters, New York City, and Charles H. Rex, Traffic Control Specialist, General Electric Co., Chicago.

REPORTS OF TECHNICAL COMMITTEES:

Professional Curriculum; Prof. Roger L. Morrison, Chairman.

Policy; Dr. Miller McClintock, Chairman.

Terminology and Nomenclature; Chairman, T. M. Matson, Traffic Engineer, City of Philadelphia.

Standards and Specifications; Chairman, Howard F. Ilgner, Chief Engineer, Bureau of Electrical Service, Milwaukee, Wis.

Discussion.

Afternoon Session, October 2

Chairman, Guy Kelcey, Director, Institute of Traffic Engineers; Sales Manager, Signal Service Corporation, Elizabeth, New Jersey.

How the Traffic Engineer Can Assist in Dealing with the Human Element in the Driver Problem; James Stannard Baker, Secretary, Committee on the Driver, National Safety Council, Chicago.

Discussion opened by Dr. Alvah B. Lauer, Associate Professor of Psychology, Iowa State College, and Burton W. Marsh, President, Institute of Traffic Engineers; Director, Safety and Traffic Engineering Department, American Automobile Association, Washington, D. C.

Method of Figuring Vehicle Delays Caused by Traffic Signals and the Length and Division of the Cycle in the Traffic Control; Carl P. Nachod, Vice-President, Nachod and United States Signal Company, Inc., Louisville, Ky.

Discussion opened by T. M. Matson, Traffic Engineer, City of Philadelphia.

COMMITTEE REPORTS:

Library Committee; Chairman, Lawrence S. Tuttle, Assistant Highway Economist, U. S. Bureau of Public Roads.

Membership Committee; Chairman, J. W. A. Bollong, Traffic Engineer, City of Seattle.

Publications Committee; Chairman, Maxwell Halsey, Traffic Engineer, National Bureau of Casualty and Surety Underwriters, New York City.

Finance and Auditing Committee; Chairman, Ralph W. Eaton, Traffic Engineer, Providence.

Discussion.

Dinner Session, October 2

Presiding, Burton W. Marsh, President, Institute of Traffic Engineers; Director, Safety and Traffic Engineering Department, American Automobile Association.

The Effect of Automotive Development upon Urban Real Estate Values; Dr. David Friday, ex-President of Michigan State College, and former Professor of Economics, University of Michigan.

Capacity of Traffic Lanes; Report of the Research Committee on this subject by Leroy E. Peabody, Chairman; Senior Highway Economist, United States Bureau of Public Roads, Washington, D. C.

Election of officers and brief business meeting. Open forum discussion.

Morning Session, Wednesday, October 3

Chairman, Ernest P. Goodrich, Director, Institute of Traffic Engineers; Consulting Engineer, New York City.

Our Highway Development Program; Thomas H. MacDonald, Chief, U. S. Bureau of Public Roads.

Discussion.

The Effective Presentation of Traffic Cases in Court; Frank M. Kreml, Director, Bureau of Accident Prevention, Department of Police, Evanston, Ill.

Discussion opened by Inspector George Schlamp, Police Department, Detroit, Mich.

Protection of Railway Grade Crossings; Philip X. Rice, Assistant Professor of Electrical Engineering, Pennsylvania State College.

Discussion opened by S. W. Griswold, Griswold Signal Co., Minneapolis, and A. H. Rudd, Signal Engineer, Pennsylvania R. R., Philadelphia.

Possibilities of Eliminating Unnecessary Restrictions and Providing More Parking Space, and the Effect of Parking Regulations on Retail Business.

Open Forum and general discussion.

Afternoon Session, October 3

Joint meeting with the Street and Highway Traffic Section, National Safety Council

Chairman, Lewis W. McIntyre, Vice-President, Institute of Traffic Engineers; Traffic Engineer, Bureau of Traffic Planning, City of Pittsburgh.

THE CIVIL WORKS ADMINISTRATION TRAFFIC SURVEYS.

(a) *Accomplishments and Problems That Arose When the CWA Terminated;* Sidney J. Williams, Director, Institute of Traffic Engineers; former Director of Safety, Civil Works Administration; Director, Public Safety Division, National Safety Council.

(b) *Continuation of Surveys under FERA;* E. W. James, Chief, Division of Highway Transport, U. S. Bureau of Public Roads, Washington, D. C.

(c) *Some Interesting Phases of the Unusual Studies Made in the Massachusetts Highway Accident Survey;* Col. R. C. Eddy, Director, Massachusetts Highway Accident Survey, Boston.

(d) *National Studies of Survey Data on Law Observance;* Earl J. Reeder, Traffic Engineer, National Safety Council.

Discussion.

Report of the Committee on Traffic Engineering, of the National Safety Council; Lewis W. McIntyre, Chairman.

Discussion.

Relation Between Street Accidents and the Quality of Illumination; R. E. Simpson, Consulting Engineer, Hartford, Conn.

Discussion.

The Ultimate Economy of Adequate Relief Through Public Works

To the Editor of THE AMERICAN CITY:

Sometimes relief measures are urged—or excused—on the ground that they are safeguards against riot and revolution; sometimes for the sake of sweet charity; sometimes in the name of social justice. They are opposed for reasons of public economy, endangered public credit, and the demoralizing influence of doles.

Too seldom are the cold economic advantages of relief stressed. But if government, as the agent of all the people, had from the start recognized a social duty to relieve distress, in complete and generous fashion, every dollar so expended would have gone directly into the stream of business, purchasing activity in essentials would have kept up, and, being virtually assured, would have enabled great sections of agriculture and industry to remain stable and help to stabilize all industry; and it can well be doubted whether the depression could have grown so deep and long.

Today, whether the economic tide is rising or falling, adequate, generous relief is the most immediately effective course, not alone for the sake of the destitute but to stimulate economic life. Not merely declarations that no one shall hunger are enough, even if believed in and carried out. Much more is necessary if we are to get well; something like an assurance of a minimum decent living standard; security of comfort in the home, not mere subsistence.

One obstacle is a pious concern for the morale of the unemployed. Those who live in comfort would withhold comfort from the less fortunate for fear of pauperizing them. But what more uncertain than the basis of such morality, and who is qualified to pass judgment?

The other great obstacle is a practical concern for the public, and therefore the private, purse. Who shall pay, and how? If food, clothing, shelter are not to be confiscated, they must be paid for with cash or credit. Many state and local governments have no surplus of either. From time to time this has been said of the Federal Government also; but when has the national credit been really in peril?

While the essential need is to spread the national income—which will increase by the very spreading—there is also virtue in spreading work; not from the moral standpoint of making the needy work, unless that doctrine be applied to all who could work but have incomes without toil; not for the purpose of making the masses work more, but to lessen work—not pay—for every worker.

What else is the meaning and the worth of technical advance if the saving of labor is not to benefit all who labor? Truly we can each work less than custom has prescribed and yet produce more for all; and there is vast need of more for all—not gadgets, and delicacies, and shoddy trash for selling, but more of real comfort, convenience, safety, enjoyment, beauty, and the common wealth for public use. And while striving to ease the burden of daily work—no easy goal, but one demanding much adjustment and careful planning—why not use the great reservoir of labor now at hand to add to that common wealth?

Millions of men cry for work. Billions of dollars' worth of work is ready to be done: not work that competes with factories and farms, but public work, producing common wealth—and making consumers, to revive the factories and farms and restore value to private wealth.

How shall we pay? Chiefly through the vast power for production that can thus be given life again, safely, quickly and in large measure. Tax this new wealth to pay for borrowing; to check inflation before that means danger; to divert the surplus from needless, harmful private investment to useful public work. Borrow, inflate—but tax surplus income, today and tomorrow, boldly and heavily, for the sake of social and economic health and balance.

We can perhaps survive without larger public spending. We can redistribute by the violent process of confiscation, or the blind process of devaluation, or the difficult, detailed, disrupting process of merely spreading work and income. We must redistribute through public relief. But what vast opportunities we have at hand in public work, to give employment, distribute income, cure distress, speed industry and make lasting wealth for all!

H. M. OLMSTED.

New York City.

Water Rates and Service Charges, Installation Charges, Hydrant Rentals and Sprinkler Costs—V

Abstracts of Water Department and Company Reports

Jacksonville, Fla.

Population	140,000
" served	133,000
Number of services	28,681
" " meters	26,155
" " hydrants	1,728
Miles of water main	372.3

Water rates are based on the estimated value of the residence or place of business inside the city limits. For each residence over an estimated value of $600.00 and for each separate place of business or for any purpose other than for construction, the minimum meter rate is $12.00 per year, for which 14,800 cu. ft. of water is permitted; for each residence under an estimated value of $600.00, the minimum meter rate is $8.00 per year, for which 10,000 cu. ft. of water is permitted; for each residence under an estimated value of $400.00, the rate is $6.00 per year, for which 7,400 cu. ft. of water is allowed; for residences under the estimated value of $400.00, for two houses adjacent to each other owned by the same party and furnished with water through one meter, the rate is $8.00 per year, providing the full rate is paid though one house be vacant. Where residences are under the estimated value of $300.00 each, for two houses adjacent to each other owned by the same party and furnished with water through one meter, the rate will be $6.00 per year, providing the full rate is paid though one house be vacant. Outside the city limits the rates are 15% above those enumerated.

When more than the stated allowance of water is consumed, the excess is charged for at the following rates:

	Inside City Limits	Outside City Limits
Under 200 cu. ft. average per day consumed	8c	12c per 100 cu. ft.
200 to 500 " " " " " "	7c	10c " " " "
500 to 800 " " " " " "	6c	8c " " " "
800 to 1,000 " " " " " "	5c	7c " " " "
Over 1,000 " " " " " "	4c	6c " " " "

Payments are made quarterly in advance on the first day of January, April, July and October; 10% discount is allowed on the yearly advance rate when paid within 10 days from the date of the bill.

The following schedule of tapping charges is made for new services and includes 100 feet of pipe of appropriate size for the service:

Size Tap	Size Service	Size Meter	Maximum Fixtures Allowed	No. Buildings, Stores or Flats Allowed	Street Paved	Street Unpaved
¾"	1"	⅝"	12	3	$18.00	$14.00
Branch	1"	¾"	6	2	.	6.00
¾"	1"	¾"	20	4	20.00	16.00
1"	1¼"	1"	48	8	23.00	19.00
1¼"	1½"	1¼"	112	16	35.00	30.00
1½"	2"	1½"	200	32	50.00	45.00

The charge for public hydrants is $35.00 each per year, and there is no charge for private fire hydrants.

O. Z. Tyler,
Superintendent, Electric Plants and Water Department.

Nashville, Tenn.

Population	153,866
" served	183,730
Number of services	36,746
" " meters	37,795
" " hydrants	2,435
Miles of water main	331 inside city 75 outside city

The domestic and industrial meter rates for Nashville are as follows:

Cubic Feet per Quarter	Per 100 Cu. Ft.
From 1,100 to 2,000	14c
Over 2,000 to 5,000	13c
" 5,000 to 15,000	12c
" 15,000 to 35,000	11c
" 35,000 to 75,000	10c
" 75,000 to 120,000	9c
" 120,000 to 240,000	8⅝c
" 240,000 to 360,000	8¼c
" 360,000 to 480,000	7⅞c
" 480,000 to 600,000	7½c
" 600,000 to 720,000	7¼c
" 720,000 to 840,000	6¾c
" 840,000 to 960,000	6⅜c
960,000 cu. ft. or over	6c

Minimum charge per quarter, $1.50.

Permits for new services must be obtained from the Water Works Department, and applications must be accompanied by excavation permits, granted by the engineering or highway department controlling the street in which the service is to be laid. Permits are granted only to regular licensed plumbers. All taps are made by the city Water Works Department, and no taps or connections smaller than ¾" are permitted. All service pipe 1" in diameter and under from cast iron mains must be full lead from the main to the meter, and all service pipes over 1" in diameter and up to and not including 3" in diameter from cast iron mains must be genuine wrought iron pipe. Service pipes run from galvanized iron mains may be either lead or galvanized iron. If the service is of galvanized iron, there must be 18" of flexible lead pipe joining the iron pipe to the tap in the main. All service pipes 3" in diameter and larger must be of cast iron and not less than Class B. An ordinance controlling service installations requires the following procedure: first, the meter box shall be built; second, the part of the service pipe between the meter box and a point within the foundation of the house shall be installed; third, the part of the service pipe from the meter box to the main shall be installed; fourth, the tap and connection to the main in the street shall be made; fifth, water should be turned on the service pipe between the main and the meter, blowing any accumulated trash out of the pipe before setting the meter; sixth, set and connect up the meter, being careful to set the inlet side towards the direction from which water is flowing. Valves and shut-offs are required on all water lines at points designated by the Water Works Department; and valve boxes shall be placed over all shut-offs. Meters larger than ⅝", and also any meters for upstairs apartments and all meters set outside the city limits, must be furnished by the consumers. Other meters are furnished by the Water Works Department.

Hydrant rentals for public fire hydrants are $40.00 per year per hydrant outside the city, and no charge is made within the corporation limits to the city. Unmetered sprinkler connections are charged at the rate of 5c per sprinkler head per year. Metered sprinkler connections and fire services are charged the regular schedule of rates for metered water. When installing sprinklers the consumer must file with the City Clerk a bond for $1,000.00 with two or more solvent sureties or an authorized bonding company.

R. L. Lawrence, Jr.,
Superintendent and Chief Engineer, Water Works Department.

Lima, Ohio

Population	45,000
" served	45,000
Number of services	10,000
" " meters	10,000
" " hydrants	640
Miles of water main	125

The domestic water rates effective November 20, 1933, and still in force are as follows:

First 500 cu. ft. ..... $2.25 minimum charge
All over 500 cu. ft. at $1.00 per 1,000 cu. ft.

All bills are rendered quarterly.

The commercial charge for the first 1,000 cu. ft. used in 6 months is $4.50 minimum. The balance of the first million cu. ft. used in a 6-months period is billed at $1.00 per 1,000 cu. ft. All over the first million cubic feet in a 6-months period is billed at 75c per 1,000 cu. ft. All bills are rendered monthly.

The regulations for house service installations are not available at the present time, since they are being rewritten.

There is no charge for any fire service public or private other than the cost of installing the service.

E. E. SMITH, 2ND,
General Superintendent, Water Department.

Painesville, Ohio

Population	11,000
" served	10,890
Number of services	3,279
" " meters	3,258
" " hydrants	353
Miles of water main	46.21

The net water rents within the city on a quarterly basis require a minimum charge of $3.00 per quarter. The rates for water used are as follows:

First	6,000 cu. ft.	@ $2.40 per 1,000 cu. ft.	$14.40
Second	6,000 " "	@ 2.00 " " " "	12.00
Third	6,000 " "	@ 1.60 " " " "	9.60
Fourth	6,000 " "	@ 1.40 " " " "	8.40
Fifth	6,000 " "	@ 1.30 " " " "	7.80
Sixth	6,000 " "	@ 1.20 " " " "	7.20
Seventh	6,000 " "	@ 1.00 " " " "	6.00
All over	42,000 "	" quarterly @ $.80 per 1,000 cu. ft.	

All quarterly rents are net charges with no discount allowed. The ends of the four annual water rent quarters are approximately March 31, June 30, September 30 and December 31. Where the consumption of water each month exceeds 30,000 cubic feet, water is billed at $1.00 per 1,000 cu. ft. for the first 50,000 cu. ft. and the balance at $0.80 per 1,000 cu. ft.

The entire cost of service connections from the city main to the location of the desired supply except the cost of the water meter is paid by the property owner or person making the application, and the work from the main to a point inside the curb line, including the tap, is done by water-works employees. The charges for the various portions of this work are as follows:

For ½" and ⅝" taps, $5.00 for labor and materials; for ¾" taps, $7.50 for labor and materials; for 1" taps, $10.00 for labor and materials; lead service joints cost $3.25, $6.00 and $7.50 for ⅝", ¾" and 1" joints respectively, furnished and installed; curb cocks cost $2.50 for ⅝" and ¾", and $3.50 for 1" cocks furnished and installed; curb boxes cost $2.25 for 2¼", $7.50 for 5¼" drain curb boxes 3 to 4 ft. high, and $8.00 for 5¼" drain curb boxes 3½ to 4½ ft. high. The charge for furnishing and laying ¾" galvanized wrought iron service pipe after the applicant has performed the necessary excavation, is 15c per ft. The cost of other size service pipe up to 2" diameter is in proportion.

There is no rental charge for the public hydrants owned by the city.

The installation of private fire protective devices is permitted, but all such devices must be metered and water paid for at the regular rates. In case of a separate meter for one or more fire hydrants or sprinkler systems, the following quarterly rates are charged in addition to any metered consumption.

Tap 1½"	$2.00 per quarter
" 2"	2.00 " "
" 3"	2.00 " "
" 4"	3.00 " "
" 6"	3.00 " "
" 8"	5.00 " "
" 10"	5.00 " "

Unmetered fire hydrants and sprinkling systems for private use may be installed from the closest city main in a city street and maintained entirely at the cost of the applicant. The following rates are charged for the respective sizes of flat rate or unmetered fire hydrants and sprinkling systems:

2" and 3" tap, per quarter	$ 4.00 each hydrant or sprinkling system
4" " " "	8.00 " " " " "
6" " " "	10.00 " " " " "

C. S. FULLERTON,
Assistant City Manager.

Watertown, N. Y.

Population	31,800
" served	31,500
Number of services	6,700
" " meters	6,500
" " hydrants	515
Miles of water main	73.5

All water supplied through a meter is charged for in accordance with the following sliding scale of rates:

3,300 cu. ft. per month, or 10,000 cu. ft. per quarter, $0.90 per 1,000 cu. ft.

Excess over 3,300 cu. ft. per month, or 10,000 cu. ft. per quarter, up to and inclusive of 33,000 cu. ft. per month, or 100,000 cu. ft. per quarter, $0.70 per 1,000 cu. ft.

All the excess over 33,000 cu. ft. per month, or 100,000 cu. ft. per quarter, $0.50 per 1,000 cu. ft.

SERVICE CHARGE

Size of Meter	Monthly Charge	Quarterly Charge	Annual Charge
⅝"	$ .25	$ .75	$ 3.00
¾"	.40	1.20	4.80
1"	.60	1.80	7.20
1½"	1.10	3.30	13.20
2"	1.75	5.25	21.00
3"	3.40	10.20	40.80
4"	5.00	15.00	60.00
6"	10.00	30.00	120.00
8"	15.00	45.00	180.00
10"	20.00	60.00	240.00
12"	25.00	75.00	300.00

In an ordinance adopted November 28, 1932, the city was required to furnish and set all meters and to pay for all meters which had previously been installed by private owners on the basis of the original cost less a 5 per cent depreciation charge per year for their use, this amount being credited against the water used on the premises of the meter taken over.

The price for installing service pipe to the property line for all uses except fire service is as follows:

For ¾" service pipe	$ 2.00
" 1" "	7.00
" 1½" "	15.00
" 2" "	or larger 20.00

The city makes all repairs to existing service pipe to the property line free of charge.

There may be included in the budget for each fiscal year the rate of 1.2c per inch-foot of main 6" in diameter or larger, and $20.00 for each standard hydrant with one steamer and not less than two hose outlets with a minimum gated branch 6" or larger, these funds being paid to the Water Department.

For service pipes for fire service, 2" in diameter or over, the charge is figured on the full diameter of each service pipe according to the following table:

Size of Fire Line	Monthly Charge	Annual Charge
2"	$1.30	$15.60
3"	2.55	30.60
4"	3.75	45.00
6"	7.50	90.00
8"	11.25	135.00
10"	15.00	180.00
12"	18.75	225.00

If, however, a fire service is metered, the charges are made according to the rates for metered water. The price for installing fire services to the property line is merely the cost of installation. Where there are several independent services into one building or establishment, some supplying normal use and others supplying fire service, the regular service charge shall apply to each pipe separately.

HAROLD J. HALEY,
Superintendent, Water Department.

Allentown, Pa.

Population	95,500
" served	95,500
Number of services	23,353
" " meters	232
" " hydrants	940
Miles of water main	139.4

The meter rates per thousand gallons are as follows:

First 1,500 gals. or less, per month	$1.06⅔
1,500 to 2,250 gals. per month	.40
2,250 to 3,750 " " "	.32
3,750 to 7,500 " " "	.26⅔
7,500 to 15,000 " " "	.21⅓
15,000 to 22,500 " " "	.18⅔
22,500 to 37,500 " " "	.16
37,500 to 75,000 " " "	.14⅔
75,000 to 150,000 " " "	.13⅓
150,000 to 225,000 " " "	.12
225,000 to 450,000 " " "	.10⅔
450,000 to 750,000 " " "	.09⅓
750,000 or more " " "	.08

The meter rents per month are listed below:

¾" meter per month	$ .06
1" " " "	.08
1½" " " "	.15
2" " " "	.25
3" " " "	.35
4" " " "	.50

Both the meter rates and the meter rents are subject to a 50 per cent discount if the bill is paid within 15 days after presentation.

The city ordinances require that all service pipes from the main to the curb cock be either cast iron or lead. Lead is used for services from ⅝" to 2" diameter, and cast iron above 2" diameter. In order to determine the value of copper pipe for services, the Bureau of Water has permitted the use of red copper pipe during the last two years at certain locations. All services installed in Allentown must have a roadway curb stop 12" from the curb, and a service for each property.

No charge is made for fire hydrants or for sprinkler systems.

W. R. SCHNABEL,
Superintendent and Engineer, Bureau of Water.

New Haven, Conn.

Population	162,650
" served	246,281
Number of services	41,218
" " meters	23,293
" " hydrants	2,401 (public)
Miles of water main	490.98

The charge for water through each meter for New Haven and outside districts is as follows:

First	1,000 cu. ft.	20c per 100 cu. ft. per quarter
Next	9,000 " "	17c " " " " " "
"	90,000 " "	14c " " " " " "
"	900,000 " "	11c " " " " " "
All over	1,000,000 " "	6c " " " " " "

The rates prescribed by the Public Utilities Commission provide a schedule made up of a consumption charge and a service charge. The service charge replaces what was formerly known as a minimum bill, and is based on the size of the meter. The consumption charge is based on the water used. The service charge provides for certain costs which are not directly related to the amount of water used. These consist in part of certain fixed costs, such as interest, depreciation, insurance, etc., and also such consumer costs as billing, collecting, accounting, inspection and meter reading. It also includes the installation and taking-out of meters in service. The service charges are as follows:

Size of Meter	Quarterly	Season
⅜" and ¾"	$ 1.50	$ 5.00
1"	2.25	7.00
1¼" and 1½"	3.75	11.00
2"	6.00	18.00
2½"	9.00	24.00
3"	12.00	30.00
4"	20.00	45.00
6"	40.00	90.00
8"	100.00	200.00
10"	150.00	300.00

There is no charge for public fire hydrants, but the charge for private hydrants is $40.00 per year each. Private fire connections are billed at the following rates:

Under 4" diameter connection	$ 12.00
For a 4" " "	25.00
" " 6" " "	50.00
" " 8" " "	100.00
" " 10" " "	125.00

R. B. Welch,
Assistant Treasurer, New Haven Water Company.

Taunton, Mass.

Population	37,000
" served	37,000
Number of services	7,086
" " meters	6,688
" " hydrants	1,337
Miles of water main	109.33

The following schedule of meter rates is used with a minimum semi-annual charge of $3.00, which is payable in advance.

First	10,000 cu. ft. used per quarter,	19c per 100 cu. ft.
Next	90,000 " " " "	10c " " " "
Over	100,000 " " " "	6¾c " " " "

All applications for the use of water must be made at the office of the Water Commissioner. The Water Board furnishes service pipe connections from the main pipe to the street line at the expense of the Water Department, and reserves the right to furnish and lay all underground pipe that is not supplied through a meter. The Water Department furnishes the meters, which are guaranteed for not less than 10 years from the time of setting, but the guarantee does not cover damages by freezing, hot water or maliciousness. The charges are $12.00 for a ⅝" meter; $16.00 for a ¾" meter, and $21.00 for a 1" meter, with prices specially quoted on the larger sizes of meters.

Where the Department installs services on private property, it charges 50c per foot for digging and laying 1" pipe, 80c per foot for 1½" pipe and $1.00 per foot for 2" pipe, with an allowance of 15c per foot where the digging is done by the applicant. Red brass pipe is used for all services.

There is no charge for either public or private fire hydrants, and there is no charge for sprinkler systems other than the charge which is made for the service installation.

Arthur C. King,
Superintendent, Taunton Water Department.

Newton, Mass.

Population	70,600
" served	70,600
Number of services	14,808
" " meter	15,651
" " hydrant	1,585
Miles of water main	206.43

The minimum charge for metered water is $2.25 per quarterly billing period, for which 1,125 cu. ft. of water is allowed. All water is supplied through meters at the following rates for consumption averaging daily for three months:

Under 1,000 cu. ft. per day,	20c per 100 cu. ft.
All in excess of 1,000 cu. ft. per day at	12c " " " "

The charge for the installation of services is the exact cost to the city. Service repairs from the main to the property line are the city's responsibility, but all repairs from the property line to the meter are charged to the property owner. New services are applied for and bear the signature of the party who intends to pay the bills. The applicant is allowed to dig his own trench under city supervision, but the city must make the entire service installation.

There is a flat annual charge of $5,000 to the city for rental for public fire hydrants. There are no sprinkler charges, as all water is metered.

Richard H. Ellis,
Water Commissioner.

Mamaroneck, and Harrison, N. Y.

Population	25,000
" served	35,000
Number of services	7,440
" " meters	7,300
" " hydrants	902
Miles of water main	123

The rate schedule for metered service starts with a charge of $3.00 per quarter for ⅝" meters for which 950 cu. ft. of water is furnished. For meters larger than ⅝", the fixed service charges are as follows:

¾" meters	$ 1.50 per quarter
1" "	3.00 " "
1½" "	6.00 " "
2" "	10.62 " "
3" "	21.87 " "
4" "	37.50 " "
6" "	81.25 " "
8" "	143.75 " "
10" "	212.50 " "

In addition to the above fixed service charges, and for water used through ⅝" meters in excess of the quarterly allowance of 950 cu. ft., water actually consumed is charged for at the following rates:

First	5,000 cu. ft. used within the quar.,	30c per 100
Next	15,000 " " " "	25c " "
"	30,000 " " " "	20c " "
Over	50,000 " " " "	12c " "

Applications for service and for taps and service connections to water mains or pipes owned by the Westchester Joint Water Works No. 1 must be made in writing by the owner of the property to be supplied or by his duly authorized agent, at the office of the Water Works on forms furnished. At the time of signing the application, the owner or his agent must pay in advance the following charges which are made for taps and service connections:

Size of Tap	Amount
¾"	$25.00
1"	30.00
1½"	60.00
2"	80.00

For service taps over 2" in diameter, the applicant is required to make a deposit, which is applied against the cost of making the tap and service connection; and the excess, if any, is refunded. These charges include only the amount of pipe necessary for the installation in the public street, or from the water main to a point near the curb line of the property to be supplied, designated as the location of the curb box, together with suitable materials, such as tap couplings, curb cocks and curb boxes, complete with rod and cover, and the labor necessary for the installation of these pipes and fittings. The consumer is required to prepare the necessary trench for the pipe and to do the backfilling and road repairing required by local authorities at his own expense. The consumer must likewise furnish at his own expense the service pipe extending from the curb box to the premises to be supplied. All service pipes leading from the curb boxes to the premises must be either of copper, brass or lead and not less than ¾" in diameter. The use of galvanized iron pipes for service lines is strictly prohibited. A separate tap or service pipe is required for each consumer in a building taking water through a separate meter, but any number of families or business units in a building may be supplied by the owner thereof through a single meter.

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Get this Goodrich Triple Protected Tire

It's the sidewall "Failure Zone" that runs up tire bills and trucking costs. Many tires blow out in the sidewall long before the tread is worn. Jobs are delayed. Tires are ruined. Trucks and men stand idle.

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Write today for your free copy of "The Truck Operator's Handbook," full of valuable truck tire data that you can put to immediate use. No obligation. Address Department T-135, The B. F. Goodrich Company, Akron, Ohio.

See your Goodrich truck tire dealer. Ask him to show you how these three exclusive Goodrich features positively check 80% of premature failures:

1 PLYFLEX—a *new*, tough, sturdy rubber material with greater resistance to stretch. A layer of Plyflex in the sidewall distributes stresses and strains—prevents ply separation—checks local weakness.

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Goodrich *Triple Protected* Silvertowns
FOR TRUCKS AND BUSES

Why not remember to mention THE AMERICAN CITY?

All meters used are furnished by the water utility and remain its property. All such meters are installed by its employees, and for each installation a charge is made at the following rates, payable in advance on signing the application for water:

Size of Meters	Charge
⅝″	$4.50
¾″	5.00
1″	6.00
1½″	7.50
2″	9.00

For the installation of all meters over 2″, a deposit is required, which is applied against the cost of installation; and the excess, if any, is refunded. The consumer must furnish all fittings, such as stop cocks, valves, etc., as may be ordered by the Superintendent.

Water bills are rendered at quarterly intervals and are due and payable within 10 days from the date thereof at the office of the Water Works. In case of failure to pay any bill within 10 days after presentation or mailing to the last known address of the owner, the supply may be shut off and the meter removed without notice to the consumer. The Superintendent may assign to any employee of the Water Works the duty of shutting off water for non-payment of bills, and a charge of $1.00 is made to the consumer if an employee is required to call for this purpose, regardless of whether the water is turned off or not. An additional charge of $1.00 is made for the turning on of water previously shut off for non-payment.

WILLIAM E. THRASHER,
General Superintendent, Westchester Joint Water Works No. 1, Mamaroneck, N. Y.

Poughkeepsie, N. Y.

Population	41,000
" served	44,000
Number of services	7,399
" " meters	7,399
" " hydrants	916
Mile of water main	74.917

The schedule of meter rates adopted by the Board of Public Works, December 30, 1919, is still in force and is as follows:

When the consumption of water equals 10,000 cu. ft., or less, per quarter				$2.00 per 1,000 cu. ft.
Excess of 10,000 cu. ft. to 20,000 cu. ft.				1.75 " " " "
" " 20,000 " "				1.60 " " " "

The meter rate bills are due and payable to the City Treasurer on or before the 15th day of January, April, July and October of each year. There is a minimum rate of $1.00. The property owner is responsible for placing the meters so that they are accessible for reading, and must so protect them that they do not freeze. A charge of $2.00 is made when a meter is damaged by freezing. If water is turned off for non-payment of bills, a charge of $2.00 is made before the water is turned on again.

METER RENTALS

Size		
⅝″	$ .25	per quarter
¾″	.50	" "
1″	1.00	" "
1½″	1.50	" "
2″	2.00	" "
3″	3.00	" "
4″	4.00	" "
5″	5.00	" "
6″	6.00	" "

There is no charge for public or private hydrants or for sprinkler systems for private fire protection.

THOMAS F. LAWLOR,
Superintendent, Board of Public Works.

Mt. Penn Borough, Pa.

Population	6,500
" served	6,500
Number of services	1,700
" " meters	1,700
" " hydrants	88
Miles of water main	19

The meter rate schedule was changed February 28, 1933, from a readiness-to-serve to a minimum type of schedule permitting all consumers to obtain water at a lower rate as follows:

METER RATES

	Per Quarter
½″, ⅝″ and 1″ meter	$ 3.00
1¼″ meter	4.50
1½″ "	6.75
2″ "	12.00
3″ "	27.00
4″ "	48.00
6″ "	108.00

MINIMUM CHARGES

First	3,000 gal.	per quarter	$3.00	
Next	6,000	" "	0.50	per 1,000 gal.
"	21,000	" "	0.35	" " "
"	120,000	" "	0.25	" " "
"	150,000	" "	0.20	" " "
"	300,000	" "	0.15	" " "
"	900,000	" "	0.12	" " "
Over	1,500,000	" "	0.10	" " "

All meter bills are due and payable at the office of the company on the date of issue and bear a discount of 5% if paid within 10 days. If paid from the 11th to the 20th day inclusive after bills are due, the face amount must be paid, and if paid from the 21st to the 30th day, after being payable, the bill bears a 5% penalty. After 30 days and upon 10 days' notice, if the bill and penalty are still unpaid, the water is shut off, and it is not turned on again until all arrears are paid and an extra sum of $2.00 for expenses is also paid.

Water is furnished and the service connection made upon written application signed by the owner or his properly authorized agent or tenant on a blank prepared by the company. Connections by corporation cocks not larger than 1″ in size from the street main to the curb line are made by the company at its cost and are under its sole control. The consumer is required to obtain and pay for all required municipal permits either to open or to close the street. If the consumer requires a connection of a larger size corporation cock, he is required to pay the difference plus 10%. No service connections are installed from November 1 to March 1. Service lines are used to supply only one building, and no building may be supplied by more than one service line except when otherwise approved by the proper officials in the company. Each owner must install a stop cock immediately inside the foundation wall of the premises for the protection of the premises from injury or damage by leaks or bursting of pipes.

A charge of $10.00 per year is made for the maintenance of each fire hydrant, and a fire service charge of $100.00 per mile per year is made for each mile or tenth thereof of pipe 4″ in diameter and over. All public and private fire protection bills bear a discount of 10% if paid within 30 days.

Private fire service charges are by separate agreement with each company or individual that may desire this type of service.

CARL H. BOAS,
Secretary and General Manager, Mt. Penn Suburban Water Co., Reading, Pa.

Ripon City, Wis.

Population	3,984
" served	3,984
Number of services (including services to hydrants)	1,240
" " meters	382
" " hydrants	129
Miles of water main	14.7

The rates charged for water by the Wisconsin Power and Light Co. in Ripon City are made up of charges for water actually used, with an annual minimum rate charged. Bills are due and payable in advance quarterly on the first of January, April, July and October.

METER RATES

0 to	500 gals.	per day	25c	per 1,000 gals.
Next	500	" "	20c	" " "
"	4,000	" "	15c	" " "
"	20,000	" "	10c	" " "
Over	25,000	" "	6c	" " "

MINIMUM RATES

$ 7.00	per annum for	½″ and ⅝″ meters
8.00	" "	¾″ "
9.00	" "	1″ "
10.00	" "	1½′ "
12.00	" "	2″ "
24.00	" "	2½″ "
36.00	" "	3″ "
48.00	" "	3½″ "
60.00	" "	4″ "

All persons desiring to take water must make application in person at the office of the company and sign a register stating fully all the purposes for which it is to be used, and are assessed the established rate, paying in advance for making all attachments, including the laying of the service pipe from the lead main to the curb line, and also paying for tapping the main. The company maintains the mains and the service pipes connected to the mains which lie between the main and the curb, and consumers are required to maintain that portion of the service pipe line between the curb line and the residences.

The city of Ripon pays the Wisconsin Power and Light Co. $6,082 per year for the use of 102 hydrants. Each additional hydrant installed is charged at the rate of $59.00 per year.

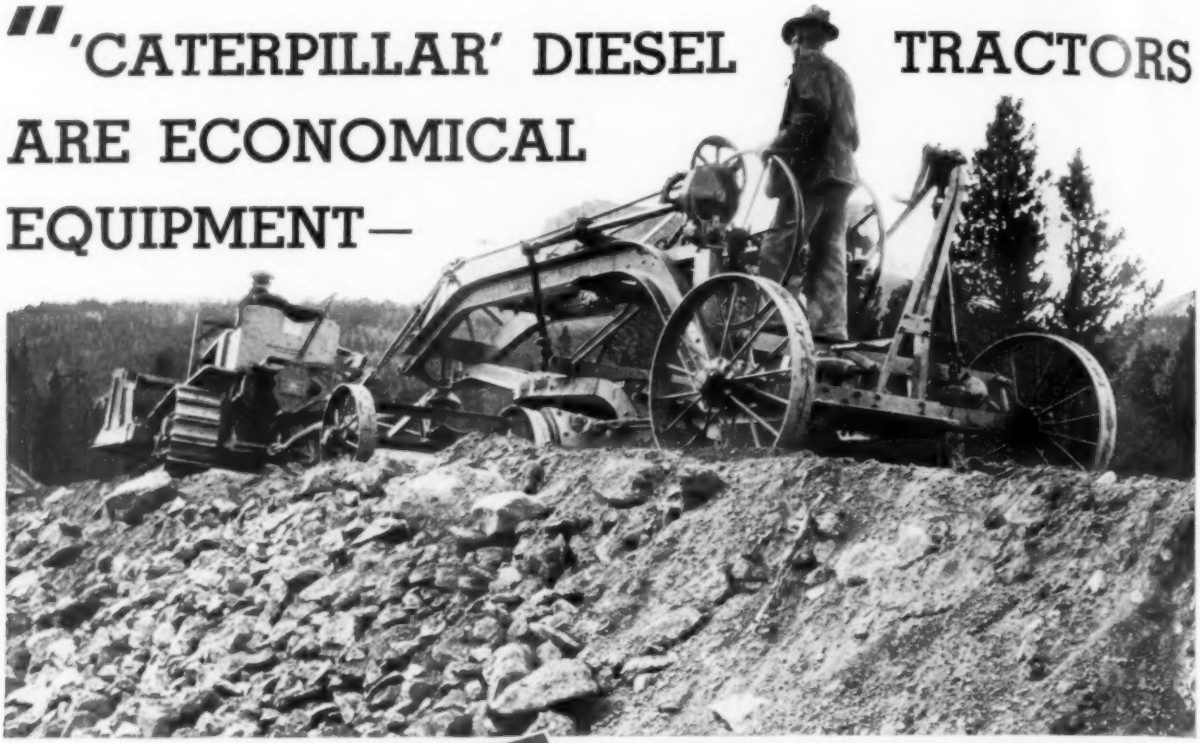
For services used exclusively for automatic sprinkler fire protection and so arranged that alarms will be sounded if water is drawn from the system, the following rate is charged over and above any charge for water which may be drawn through the system, which is always metered:

2″ service not over	200	sprinkler head		$50.00
4″ " " "	400	"	"	75.00
6″ " " "	750	"	"	100.00

Extra sprinkler heads over 750, 10c each

F. H. CHAMBERS,
Statistician, Wisconsin Power and Light Co., Madison, Wis.

"'CATERPILLAR' DIESEL TRACTORS ARE ECONOMICAL EQUIPMENT—



Platt-Rogers Construction Company uses the economical "Caterpillar" Diesel — and a "Caterpillar" Grader—on this road-building job into Estes Park, Colorado.

THE MOST ECONOMICAL MANUFACTURED FOR USE IN EITHER BUILDING OR MAINTAINING ROADS." SAYS FLETCHER SENN, SUPERVISOR OF CALHOUN COUNTY, SOUTH CAROLINA

Building a new road in the state of Washington, near Seattle, three "Caterpillar" Diesel Seventy-Five Tractors are operating at a fuel cost for each tractor of less than 15 cents an hour.

AMERICA GOES DIESEL

Night and day, these "Caterpillar" Diesel Seventy-Fives serve Contractor D. McDonald on the Junipero Serra Highway construction job in California.

The "Caterpillar" Diesel story is spreading far and wide. Into the big construction camps. To road jobs of states, counties, townships. Into foreign lands. Wherever power users seek economy and dependable performance to bring them the advantage of lower costs.

With the economy of a full Diesel engine that operates on low-price fuel and less of it, "Caterpillar" has linked simplicity, ease of operation, endurance, sure starting. More than 3500 "Caterpillar" Diesels are now in use. Ask where you can see one at work. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

Beloit City, Wis.

Population	23,611
" served	23,611
Number of services (incl. services to hydrants)	7,965
" " meters	5,710
" " hydrants	471
Miles of water main	68.6

The Wisconsin Power and Light Co. installs meters at its own expense for all consumers and charges for all water passing through the meters in accordance with the following schedules filed with the Public Service Commission of Wisconsin:

OUTPUT CHARGE PER MONTH PER METER

First	3,333 cu. ft.	17c net	18c gross per 100 cu. ft.
Next	5,000 " "	12c "	13c " " " " "
"	8,333 " "	9c "	10c " " " " "
"	16,667 " "	8c "	9c " " " " "
"	33,333 " "	6c "	7c " " " " "
Over	66,666 " "	2c "	3c " " " " "

SERVICE CHARGE PAYABLE MONTHLY IN ADVANCE

¾" meter, one consumer on meter	$ .42
¾" " " " "	.50
1" " " " "	.67
1½" " " " "	1.00
2" " " " "	1.33
3" " " " "	2.00
4" " " " "	4.00
6" " " " "	8.00
8" " " " "	12.50

For each additional consumer on the same meter an extra charge of 25c is made. Each dwelling, flat, suite, store, tenant, etc., is regarded as one consumer in determining the service charge. A discount of 1 cent per 100 cu. ft. from the gross rate is allowed if the bill is paid within 10 days from its date.

The city of Beloit is charged the sum of $26,000 per year for fire protection service. This charge covers the use of mains and hydrants up to and including the terminal hydrant and connection on each line of main existing as of October 14, 1933. For all extensions of fire service, a charge of 8c per lineal foot of pipe is assessed on the basis of the length of main placed in use between hydrants placed, plus a fixed charge of $7.50 per hydrant added to the system. Charges for fire protection service are due and payable semi-annually on July 1 and January 1. On all new extensions ordered by the city, a hydrant is set on at least every 500 ft. of main in the residence district, and on each 300 ft. of main in the manufacturing and retail business districts, and the hydrant charge is prorated in each case on this basis, whether the hydrants are ordered set or not, in accordance with the ruling of the Public Service Commission of Wisconsin.

For connections for private fire protection service, a monthly service charge payable in advance is made as follows:

2" connection (or smaller)	$ 2 17 gross,	$ 2 08 net per month
2½" "	3 42 "	3 33 " " "
3" "	4 25 "	4 17 " " "
4" "	6 33 "	6 25 " " "
6" "	8 42 "	8 33 " " "
8" "	12 58 "	12 50 " " "

In addition there is an output charge per month per meter as follows:

First	3,333 cu. ft.	17c net,	18c gross per 100 cu. ft.
Next	5,000 " "	12c "	13c " " " " "
"	8,333 " "	9c "	10c " " " " "
"	16,667 " "	8c "	9c " " " " "
"	33,333 " "	6c "	7c " " " " "
Over	66,666 " "	2c "	3c " " " " "

In installations where no meter is present, an estimate is made of the water used and a charge is made on the metered basis. The company bills all consumers at the gross rate, and the difference between the gross and net rate above specified, for general service and for private protection service, constitutes a discount for prompt payment.

F. H. CHAMBERS.
Statistician, Wisconsin Power and Light Co., Madison, Wis.

Tucson, Ariz.

Population	36,000
" served	37,300
Number of services	7,474
" " water meters	6,920
" " hydrants	580
Miles of main	110

The water-meter rates inside the city limits are $1.50 for the first 5,000 gallons, and all water used over 5,000 gallons is charged at the rate of 12c per 1,000 gals. Outside the city limits the rates are 50% higher on both minimum and excess rate ($2.25 for first 5,000 and 18c per 1,000).

The charges for installation of services from the main up to the meter, which is set at the curb line at the expense of the city of Tuscon, are as follows:

UNPAVED STREETS

¾" service	$30.00
1" "	50.00
1½" "	90.00
2" "	130.00

PAVED STREETS

¾" service	$60.00
1" "	80.00
1½" "	120.00
2" "	160.00

These charges include repairs, meter testing and perpetual maintenance of the service. All new service pipe now installed is copper. There is no street main assessment. Consumers outside the city limits must pay the above rates for a service and lay the necessary pipe from existing mains at their own expense.

For sizes larger than 2" the actual cost of labor and material in installing the service and replacing the pavement is charged plus 10%. The charges authorized include the service connection complete, except where meters are required under a sidewalk excavated to the curb line, in which case the property owner is required to construct a suitable cement box with cover for the meter, open at the top side only.

The charge against the city by the City Water Department and will apply until rentals is $2.00 per month ($24.00 per year) and the same charge is made for private hydrants.

Sprinkler charges have not been set by city ordinance as yet. The following schedule has been worked out by the Water Department and will apply until a city ordinance is passed.

10 heads	$1.50	per month
10 to 40 "	3.00	" "
40 " 80 "	4.00	" "
80 " 200 "	5.00	" "
200 " 400 "	6.00	" "
400 " 500 "	8.00	" "

A charge of 2c per head per month is made for all heads in excess of 500 heads installed. Detector check valves are required on all connections over 2".

PHIL J. MARTIN,
Superintendent, City Water Department.

Milford, Conn.

Population	12,500 (winter)
"	25,000 (summer)
Number of services	6,416
" " meters	2,387
" " hydrants	346
Miles of water main	80.6

A minimum charge of $3.00 per quarter is made on all yearly meter services where the consumption of water is less than 1,200 cu. ft. per quarter. The meter rates charged are as follows:

First	6,000 cu. ft.	25c per 100 cu. ft
Next	18,000 " "	20c " " " "
Next	36,000 " "	12c " " " "
Next	60,000 " "	10c " " " "
All over	120,000 " "	8c " " " "

Inasmuch as Milford is largely a summer community especial arrangements are made for summer customers.

The summer season is established as from April 1 to January 31. The minimum season charge for cottages previously occupied is $10.00, entitling the consumer to a maximum of 4,000 cu. ft. of water. A bill for this amount is rendered upon installation of the meter. As soon as 4,000 cu. ft. has been registered on any season bill, bills are then issued for the excess water used.

R. B. WELCH,
Assistant Treasurer, New Haven Water Company.

Beverly, Mass.

Population	25,086
" served	25,086
Number of services	5,675
" " meters	5,191
" " hydrants	616
Miles of water main	79.766

The charge for water furnished by meter is 20c per 1,000 gals., and bills are rendered quarterly. A 10% discount is allowed if the bill is paid within 15 days from the first day of April, July, October and January, otherwise the full charge is made. An extra charge of 25c is made on all bills remaining unpaid for 30 days from the dates mentioned. The minimum quarterly charge is $1.50.

Applications for the use of water are made at the office of the Commissioner of Public Works, and service pipes are laid by the city from the mains to the street line. Meters are installed by the Department at its own expense, and the owner or occupant is required to see that the meter is easily accessible for reading and protected from freezing and from other injuries. A charge of $1.00 is made for the removal of the meter for any period of non-occupancy of any premises, and a charge of $1.00 additional is made to cover the expenses of setting the meter again.

No charge is made for public fire hydrant service or for sprinkler service. In the latter case all lines are metered.

JAMES W. BLACKMER,
Commissioner of Public Works.

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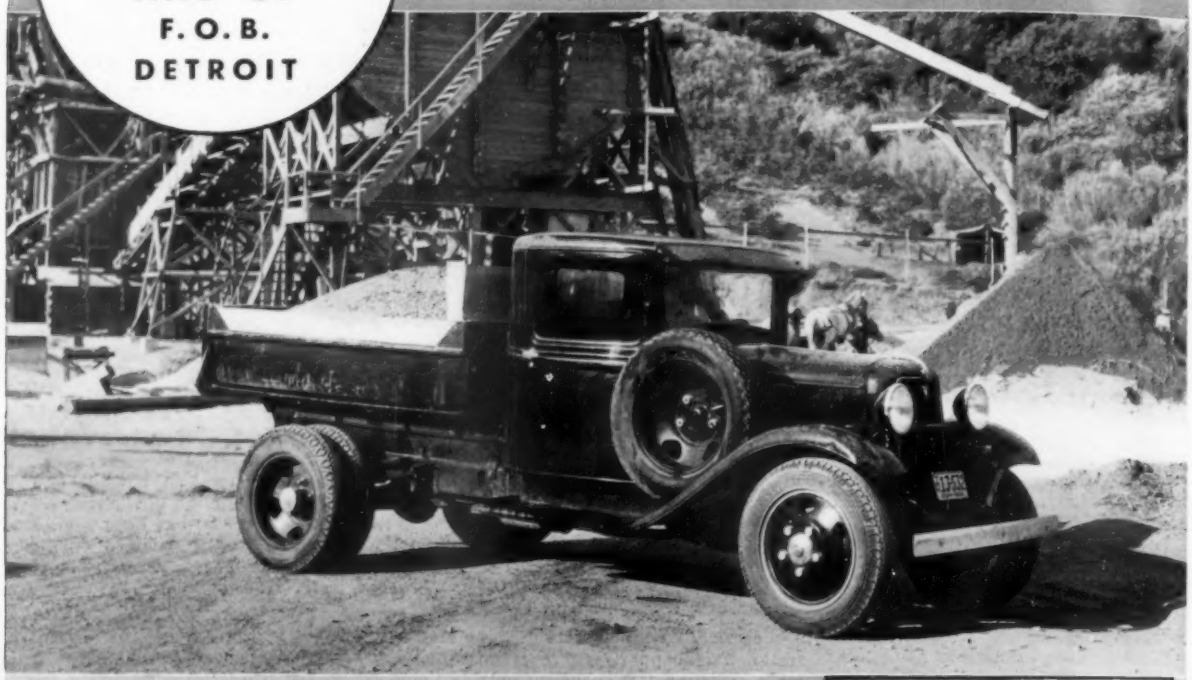

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This quality is evident in every detail . . . full-floating rear axle . . . valve seat inserts . . . dual carburetor . . . more than twice as much brake area as any other truck of similar rating . . . 80-horsepower V-8 truck engine uses no more fuel than a "four" . . . low-cost engine exchange plan ends big engine overhaul costs . . . are but a few of the quality features Ford offers.

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LOW-COST CYLINDER ASSEMBLY EXCHANGE PLAN

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FORD V·8 TRUCKS

IMPROVING MUNICIPAL ADMINISTRATION

Current Items from the Public Administration Clearing House

Cities Survey Public Works Departments

FINDING out how to save money in their public works departments by checking on where and how it is being spent is the object of two Massachusetts cities which are improving their cost accounting records with the approach of a new fiscal year. The two cities, Springfield and Worcester, have secured the assistance of Public Administration Service, of Chicago, to make surveys and install the new procedures. This consultant organization on municipal problems recently set up eastern headquarters in Boston.

With examination of the Springfield Department of Streets and Engineering partially completed, Cornelius W. Phillips, Superintendent of Streets and Engineering, estimates that an annual saving of $80,000 can be achieved. A records and cost system and revisions in operating methods are making possible this saving in the following services: construction and maintenance of paved and unpaved streets, walks and curbs; sewer construction, repair and cleaning; maintenance and operation of city plants; refuse collection and disposal and street cleaning. An accounting record for centralized maintenance of public works equipment and a central stores system are being set up in Springfield. Records and cost accounts of public works will in the future furnish city officials with periodic information showing their accomplishments. This will provide a method of direct control in the public works activities.

Worcester's survey, which is just starting, includes the Departments of Streets, Sewers, Buildings, Water and Engineering, and the garbage collection and incineration services. Here also a stores accounting system and individual equipment records will be installed, showing operating and maintenance costs of each piece of equipment.

Synchronize Tax Collection and Fiscal Year for Soundness

OLD-FASHIONED tax collection laws unsuited to modern times are one reason why cities must borrow for their current expenditures, points out Paul Studenski, Professor of Economics, New York University, in the August issue of *State Government*, journal of the American Legislators' Association.

There was a time, when the country was mostly agricultural, when money from the sale of crops made it convenient for the farmer to pay his taxes in the fall. Semi-annual payments of taxes were introduced later, partly to accommodate the urban taxpayers who earned their incomes monthly or weekly and found it difficult to pay taxes in one lump sum, and partly to provide municipalities with some of their tax revenues earlier in the year. But lean municipal pocketbooks are showing that these customs need modification, says Mr. Studenski. The fiscal year in most municipalities begins either on January 1 or on July 1, three to ten months before tax-collecting time. This makes it necessary for many cities to borrow annually or semi-annually in anticipation of tax collections. The cost of government to the taxpayers is increased, because interest must be paid, and the city is placed in dangerous dependence for its current funds on the loan market. During the depression collapsing loan markets left the cities without a borrowing source. Defaults were the frequent results.

"The need for tax anticipation borrowing may be eliminated permanently, by advancing the dates of tax collection nearer the beginning and the middle of the fiscal year," Mr. Studenski explains. New York City has made a beginning in this direction by moving the tax collection date forward one month this year, from May and November to April and October. The practice will be repeated every two years for the next six years. At the end of this time the need for anticipation borrowing will have disappeared.

"In some cases," Professor Studenski remarks, "the synchronization of tax collections and expenditures of tax moneys may be accomplished by changing the date of the fiscal year to correspond with the date of tax collections. It may be necessary during the period of the shift to finance expenditures by means of a special loan running for a term of five years or more, or by means of special taxation."

Codifying Municipal Ordinances

RETAINING laws that belong to a bygone day and keeping the record of new ordinances in a haphazard fashion make an expensive and a confusing practice, decided the city of Oakland, Calif., recently. So the City Manager asked the City Attorney and staff to look over all the 8,429 ordinances that had been passed since the city was incorporated.

The ordinances were classified and codified, and overlapping and obsolete laws were eliminated. It cost Oakland $4,239 to publish the new municipal code. But the City Manager, who describes the procedure in the August issue of *Public Management*, says that the new code will cut the cost of advertising municipal ordinances by approximately $2,000 a year.

This economy is made possible by eliminating the long titles and definitions of the ordinances and the repetition of penalty clauses, and by leaving detailed administrative regulations to the City Council resolutions, which do not have to be published.

Among other large cities which are taking a look at their ordinances are Duluth, Minn., and Pittsburgh, Pa. Duluth is preparing to repeal all obsolete city ordinances, some of which were passed more than 40 years ago. Pittsburgh has just finished the first codification of its general ordinances in 26 years.

Many state leagues of municipalities are urging smaller cities also to take their ordinances out of filing cases and tin boxes, which is the way they are often preserved, and print them in a compact, well-indexed municipal code. Codified ordinances, brought up to date from time, they explain, are handy to refer to. New officials, lawyers and citizens all appreciate the convenience of an easy, quick access to their city's laws.

Warns Against Eager Debt Adjusters

PUBLIC officials should view with critical eyes any persons who have had no previous interest in debt problems of their city but who now wish to encourage them to make use of the new Federal Municipal Debt Adjustment Act. Carl H. Chatters, Executive Director of the Municipal Finance Officers' Association, and John S. Rae, municipal finance expert, give this warning in their recently published pamphlet on the use of the Act. They point out that municipal officials are now likely to be urged to start debt-scaling proceedings or refunding plans by persons who are not interested in the local government or its creditors, but who wish to make a profit from handling the debt negotiations.

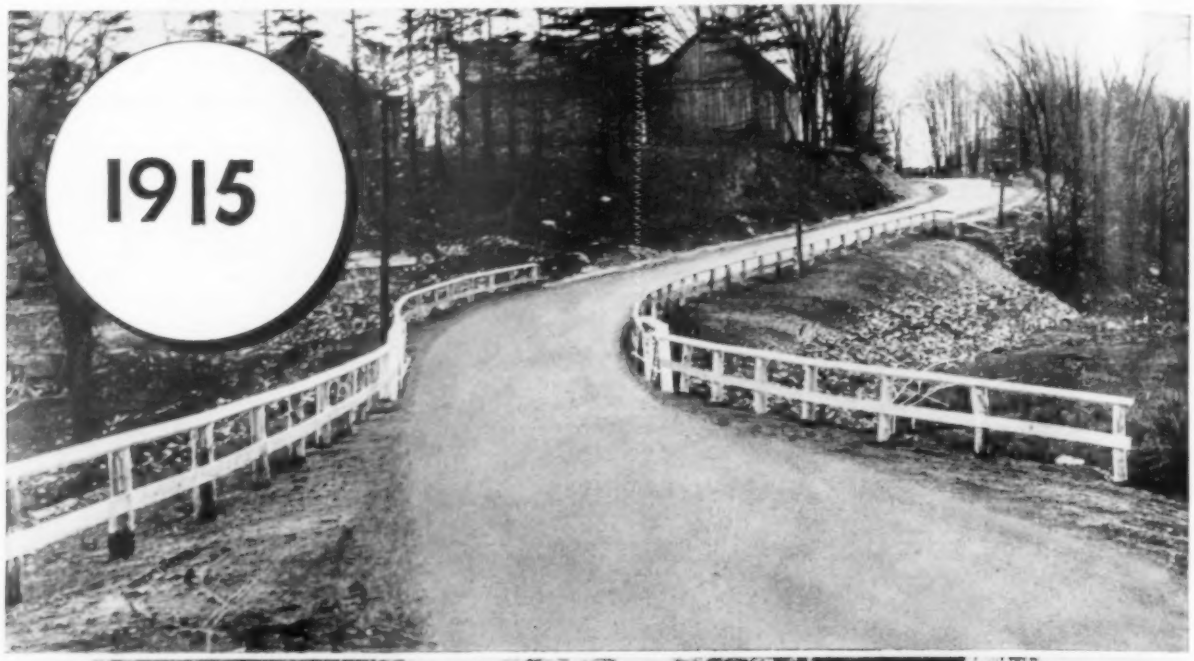
Many considerations should enter into the use of the Act:

"It should be used as a last resort, after other means of solving debt problems have failed and after the great majority of the creditors have proposed or consented to a plan."

First a tentative plan of debt settlement satisfactory to the municipality and its creditors must be formed. If this plan cannot be put into effect without litigation because a few non-cooperating bondholders object, the Federal Municipal Debt Adjustment Act may be called into service.

"The future effect on the credit of the particular municipality and other local governments must not be overlooked. While the use of the Act will in many cases stabilize and restore credit, it seems quite certain that a better credit standing will be retained if debt adjustments can be made without resorting to 'bankruptcy' legislation. Furthermore, if legal fees and other costs are to constitute a large percentage of the debt, the money might better be applied to a reduction of the debt or the payment of interest."

New York State Highway, Ellenburg, Franklin County Line. Tarvia-built in 1915. Faster automobiles and better traffic control today have resulted in traffic lines that were not so necessary when this Tarvia road was built.



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Why not remember to mention THE AMERICAN CITY?

In Justice to Dr. Watson and the Pittsburgh Tax Plan

IN a brief review of the monograph by J. P. Watson, on "The City Real Estate Tax in Pittsburgh," on page 85 of the July number of THE AMERICAN CITY, certain phrases were used which conveyed to the author of the study and possibly to some of THE AMERICAN CITY'S readers, a meaning not intended by the reviewer. Regret was expressed that more space was not devoted in the monograph to a consideration of the Pittsburgh graded tax plan, and the suggestion was made that a critical analysis of the operation of this plan by competent persons would be of great interest and value in other cities. The reviewer meant, of course, to infer that Dr. Watson and the staff of the Bureau of Business Research of the University of Pittsburgh were such a competent group. It was the scope of the study, and in no sense the ability of the researchers, which was questioned.

The statement was also made by the reviewer that under the Pittsburgh plan "land is taxed at twice the rate on buildings." The title of the monograph being "The City Real Estate Tax in Pittsburgh," it was the *city* tax rate to which the reviewer was referring—although that fact was not definitely stated, as it doubtless should have been for entire clarity. As Dr. Watson points out in a letter to THE AMERICAN CITY, and as the reviewer was well aware, "the graded tax applies only to city rates, not to the school rate or the county rate, and there is, therefore, no fixed relation between the total land rate and total building rate in Pittsburgh."

The review ended with the statement that "it is the conclusion of the author that the tax differential on land has been largely wiped out through recapitalization of land values." To do greater justice to Dr. Watson's opinion on this important subject, his exact words ought to be quoted. They are (page 32 of the book):

> "If it is true, as it appears to be, that part of the rise in building valuation, absolutely and in relation to land value, was directly an effect of the change in the tax system, then much of the real estate has been recapitalized. To whatever extent recapitalization has occurred, the graded tax has ceased to be a net differential on present owners."

On page 33, under the heading "Probable Fallacy in the Graded Tax," the author says:

> "If the taxes on land are increased more than land income (or expectation of income), that is, if the tax actually absorbs more of the rent, the investment value of the land will be reduced, and, presumably, the assessed valuation will be reduced. But absorption of a larger part of the rent by taxes will not of itself reduce the gross annual rent, and reduction of assessed valuation, other things remaining the same, will increase the net return. There will be adjustments, upward and downward, of investment value and of assessed value until there is reached a capitalization in which allowance is made for the tax differential. Subsequent change in the relationship of taxes and rent will lead to another capitalization. There will be no consistency of relation between assessed valuation and rent. In other words, the graded tax, really meant to be a classified property income tax, affects the valuation and, therefore, tends more or less to defeat itself."

If, as logic would dictate and as Dr. Watson believes, the graded tax tends to keep land values down, this suggests a need for redefining land values in future tax legislation, and of basing assessed valuations on the economic rent, or on what land would sell for if tax-free, rather than on current market value. This does not indicate, however, in THE AMERICAN CITY'S opinion, that the Pittsburgh plan of taxation has failed, or is failing, to produce beneficial results to Pennsylvania's western metropolis.

The Bureau of Business Research monograph shows that in the seventeen years since the graded tax plan began to be operative, the amount added to building valuation in Pittsburgh was more than three times the amount added to land valuation. The monograph under discussion gives no indication that there was any attempt for individual parcels to determine how much this marked differential has been due to new construction, and how much weight the assessors have given to the shift in the incidence of taxation in re-assessing land and building values. It seems quite certain, however, that as a result of the operations of the graded tax law, the Pittsburgh Chamber of Commerce and local realtors can truthfully advertise to industries and individuals that if they will come to Pittsburgh and build, they will be able to buy land more cheaply, and that subsequent taxation on the factory or home will be less, than if the graded tax were not in force. Such advantages seem to be worth increasing by new legislation which would apply the graded tax plan to school and county taxes also—and which, in all three taxes, would gradually remove still more of the burden from that part of real estate which human labor creates.

Tax Gathering by New Methods

RESOURCEFUL cities are finding new ways of convincing people that their taxes should be paid as this year's tax-gathering campaign proceeds, according to the Municipal Finance News Letter. In most sections of the country the result has been successful. Tax collections so far this year show up as better than those of last.

Memphis, Tenn., which showed 1934 collections through July to be $600,000 over those of the same date in 1933, is using newspaper ads, handbills, the radio and public speakers in the campaign. Placards are put on public buildings and public vehicles. City employees take letters to delinquent property owners, to make personal contact and to get the name and address of non-resident owners. A record of all delinquent taxes on each parcel of land has been prepared.

Wilmington, Del., whose tax collector doubled his collections this June over last, reports that friendly persuasion through personal contact gains this end.

Pittsburgh's City Treasurer has made nearly half the estimated delinquent tax collections for the year. A series of letters to large taxpayers, followed by personal calls from a committee composed of public officials and bankers, served to bring in a large amount of the tax money.

Tampa, Fla., allowing a 5 per cent discount for payment of taxes now that are due in December, received $601,423 into the treasury from July 13, when the books were opened, up to August 8. This is an all-time record for the city.

Detroit, which spent $29,000 to break its taxpayers' strike, had five million more dollars in the treasury the 10th of this month than on the same day last year, and taxes paid on a third more parcels of the property. Application of modern business principles, which included advertising in newspapers, church papers, and by billboards and pamphlets, is given credit for this success.

Newark, N. J., has undertaken a publicity campaign to collect personal taxes. A list of delinquents approximately 30,000 names long has been published in the newspapers.

Cook County, Ill., reports a 400 per cent increase in the collection of delinquent personal property taxes for the first six months of the year over the same period in 1933. This is the result of a drive by the state's attorney in cooperation with the court to bring to trial the suits against tax delinquents.

A number of cities have used Federal emergency relief works to make a house-to-house canvass, reminding citizens to pay their taxes.

Recent City Manager Appointments

R. A. BURCH was appointed City Manager of Roxboro, N. C., on August 8, to succeed W. F. Long.

A. H. Douglas, former Water Superintendent, was appointed City Manager of Wichita Falls, Texas, on July 28, to succeed V. R. Smitham.

Frank M. Hannon was appointed Acting City Manager of West Palm Beach, Fla., after the Council had forced the resignation of A. S. Andersen on August 1, because of a controversy over a debt adjustment plan for the city.

James O. Convill, Commissioner of the Port of Astoria, was appointed City Manager of Astoria, Ore., effective September 1.

George H. Cairns became City Manager of Gainesville, Fla., on July 17. He was City Manager of Gainesville from 1921 to 1928, and then served as City Manager of Sanford, Fla., for a year and a half. He succeeds W. A. Ford.

CLARENCE E. RIDLEY,
Executive Director, The International City Managers' Association.

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Housing Action—Bond Market

PWA Pledges Action on Low-Cost Housing and Slum Clearance

"THE Government has no intention to abandon or sidetrack its low-cost housing and slum-clearance activities," declared Adminstrator Ickes, in an official release on August 16, from which the following excerpts are quoted:

"It is true that we have been beset with difficulties from within and without. There are some who for selfish reasons would have us fail. There are others, only a few, I hope, who honestly still believe that the eradication of slums and the providing of decent housing is no business of Government.

"But with it all we are making progress. The acquisition of land at a fair price to the Government is a slow and tedious process through which we are passing. Obviously we cannot disclose these sites until the Government takes title. Lack of fanfare, however, should not be mistaken for inactivity. The reorganized Housing Division is stronger and better equipped to meet its problems than ever before and is plugging ahead doggedly with no thought of let-up until our objectives are achieved.

"One limited dividend housing corporation project at Alta Vista, Va., has been completed, providing 50 trim, modern homes for the small mill town.

"Five other limited-dividend projects, including the $5,060,000 Hillside project and the $3,450,000 Boulevard Gardens project, both of New York, are under construction. Another limited dividend project is ready to start construction, bringing this phase of the program up to seven projects, all in construction stages. The total cost of the seven projects will be $11,471,600.

"The Federal program, which will place Government-financed housing projects in many cities, is now in the most complicated, and of necessity the longest, stage—that of acquiring sites. Anywhere from four to ten months is required to obtain title to the hundreds of land parcels going into a single low-cost housing site, if it is to be obtained at a reasonable cost. This entails surveys, mapping work, appraisal of property, optioning, purchasing, and, as a last resort, condemnation proceedings involving court determination of land values.

"Before any of this complicated procedure of obtaining a site is taken up, a comprehensive housing project must have been worked out by the locality concerned. This entails several months of preparation and study. Surveys and analyses of housing needs must be made. When these factors are taken into consideration, it can be seen that the progress reported today constitutes a worthy record. Highlights in accomplishments of the Housing Division are:

$127,564,500 is available for Federal housing projects.

Projects for 74 cities are under examination.

Sites for two projects in Atlanta have been purchased. Bids for the demolition of existing slum buildings were received August 15. The two projects will cost $4,800,000.

Options have been taken and Federal condemnation proceedings have been filed on the site of a $3,000,000 Cleveland, Ohio, project.

Appraisals, title examinations, surveys, and options are well advanced on ten additional sites in seven different cities.

Sites have been selected, preliminary social and economic surveys have been completed, and the various steps of land acquisition are ready to start before September 1, 1934, on four sites in four other cities.

Initiation of projects has been started in 61 other cities. Preliminary data, social surveys and land surveys are now under way preparatory to the submission of data necessary for the Housing Division to consider in allotting funds. . . . .

"On the limited dividend side of the program, a total of 533 applications for loans for projects were received, out of which only 18 were approved. Of this number, it was found necessary to rescind 11 of the projects unable to measure up to PWA requirements. It became increasingly apparent that limited dividend procedure would neither contribute to the emergency nor accomplish the ultimate objectives. Private interests could not raise clear equities of 15 per cent to obtain loans of 85 per cent on projects, and land at questionable valuation frequently became the total equity such corporations would offer.

"Despite the many obstacles which have hampered the Housing Division," Administrator Ickes pointed out, "it has gone ahead with its work in a thorough, careful manner since its reorganization in June. Before January 1, 1935, construction will start on two projects in Atlanta, three in Cleveland, and one each in Cincinnati, Indianapolis, Montgomery, Louisville and Milwaukee. From that time on, additional projects will be started at regular intervals so that by July, 1935, labor should be employed on the construction of all the projects for which money now has been allotted by PWA."

European Housing Experts Now Touring the United States

THIRTY-SIX American cities engaged in working out public housing programs will have gained ideas from experienced European housing leaders when a group of three of these experts have completed a six weeks' tour of this country, which began on August 20. The tour has been arranged by the National Association of Housing Officials, to bring to American housing leaders definite suggestions and specific proposals made in the light of the extensive housing experience of western European countries.

The itinerary follows:

August 20, 21—New York.
August 22-25—Washington, D. C.
August 26-29—Boston, Mass.; Hartford, Conn.
August 30, 31, Sept. 1, 2—Cleveland, Ohio; Buffalo, N. Y.; Erie, Meadville, Pittsburgh, Pa.; Youngstown, Akron, Columbus, Ohio.
Sept. 3-5—Detroit, Mich.; Toledo, Ohio.
Sept. 6-10—Chicago, Ill.
Sept. 10-12—Milwaukee, Wis.; Minneapolis, St. Paul, Minn.
Sept. 13-16—St. Louis, Mo.; East St. Louis, Ill.; Kansas City, Mo.
Sept. 17-19—New Orleans, La.
Sept. 20-22—Atlanta, Ga.; Montgomery, Birmingham, Ala.
Sept. 23-26—Knoxville, Chattanooga, Nashville, Tenn. (TVA).
Sept. 27-30—Cincinnati, Ohio; Louisville, Ky.; Indianapolis, Ind.; Dayton, Lima, Ohio.
October 1-3—Philadelphia, Pa.; New Jersey; Baltimore, Md.

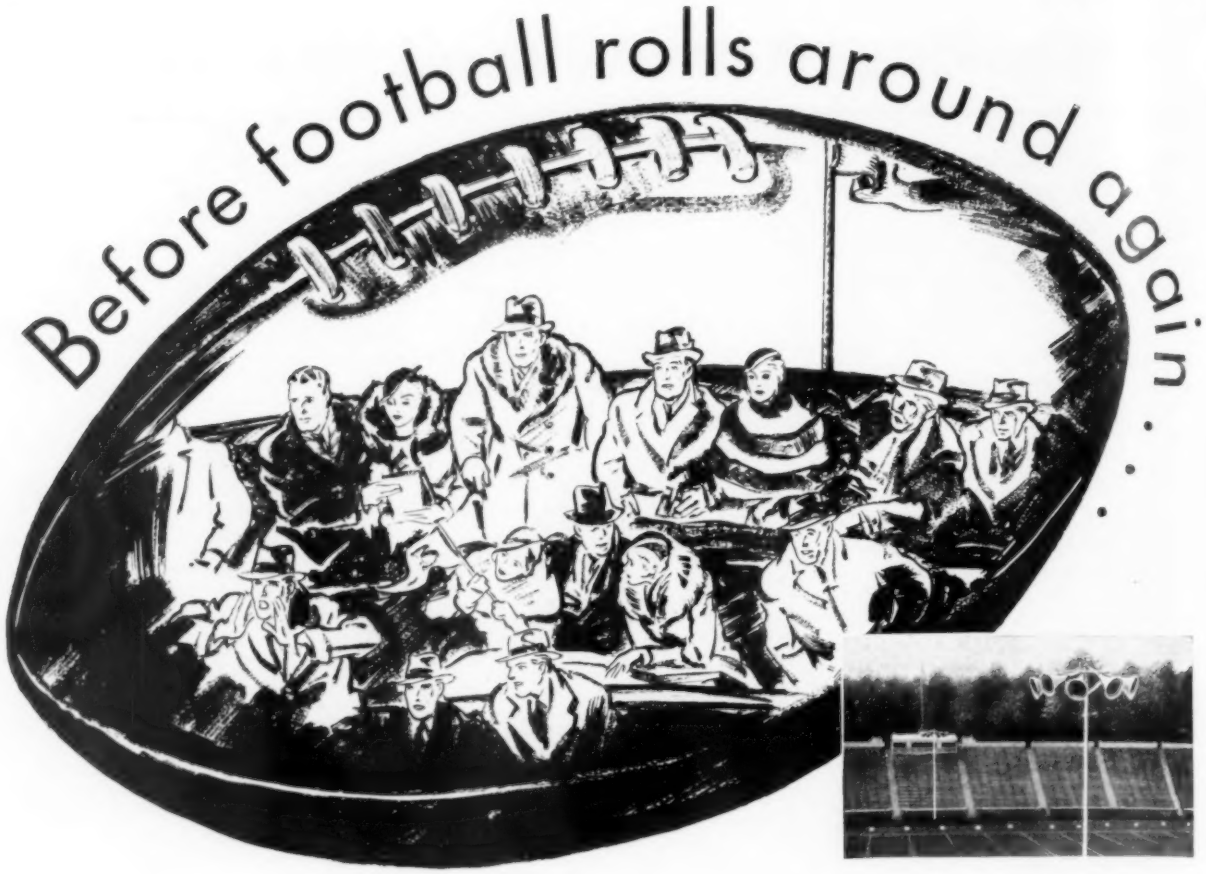
Ernest J. Bohn, Cleveland, President of the National Association of Housing Officials, and Henry Wright, of New York City, one of the outstanding housing authorities in the country, will accompany the Europeans on the tour and will participate in the conferences.

Sir Raymond Unwin, technical advisor to the Greater London Regional Planning Committee, who has long been active in British housing affairs, heads the group. The other members are Ernest Kahn, formerly manager of the municipal housing enterprises of Frankfort-am-Main, Germany, and Miss A. J. Samuel, member of the Council of the Society of Women Housing Estate Managers of Great Britain.

The Municipal Bond Market

Typical sales of new issues, from recent numbers of *The Bond Buyer*:

Amount	Borrower and Purpose	Rate (%)	Term (Years)	Basis (%)
$100,000	Manchester, N. H., Permanent Improvements	4	1-5 Ser.	2.01
160,000	Schenectady, N. Y., General Obligation, County Home	4	4.17	2.10
300,370	Buffalo, N. Y., General Improvements.	4	3 Avg.	2.50
2,000,000	St. Louis, Mo., School District Building	3	13.25	2.95
240,000	Newport, R. I., School	3	1-20 Ser.	3.10
150,000	Braintree, Mass., Sewer	3.25	1-20 Ser.	3.17
125,000	Portland, Maine, Permanent Improvement	3	1-25 Ser.	3.18
181,000	Colorado Springs, Colo., Light and Power	3	6.5	3.42
160,000	Lynchburg, Va., Water	4	20 Avg.	3.57
210,000	Wilkes-Barre, Pa., Sewer, Bridge	4	19.33 Avg.	3.66
120,000	St. Joseph, Mo., Refunding	4.5	12.66 Avg.	3.89
250,000	LaCrosse Co., Wis., General Corporate Purpose	4	5-9 Ser.	3.92
4,000,000	Chicago, Ill., Board of Education Refunding	4.75	20	4.75
500,000	Twin Falls Co., Idaho, Highway, Refunding	5	3.5 Avg.	5
153,000	Guilford Co., N. C., Refunding	5.5	12.33 Avg.	5.49



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THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Accidents

City held liable for injury to pedestrian when loose plank covering over gutter tilted (Montana Supreme Court: *Remesz v. City of Glasgow*, 28 Pac. 2d, 468).

City may enforce reimbursement against abutter for liability for injury to pedestrian due to abutter's fault, but remains primarily liable to pedestrian (Montana Supreme Court: *Nord v. Butte Water Co.*, 30 Pac. 2d, 809).

City held liable for drowning of child in uncovered irrigation ditch company was permitted to maintain in street (Idaho Supreme Court: *Hendrix v. City of Twin Falls*, 29 Pac. 2d, 352).

Notice of claim specifying claimant's attorney's office address held to sufficiently state claimant's address (California District Court of Appeal: *Uttley v. City of Santa Ana*, 28 Pac. 2d, 377).

Alleys

Projection of eaves of garage into alley held public nuisance (California Supreme Court: *Curtis v. Kastner*, 30 Pac. 2d, 26).

Bonds

Innocent holder of bonds held entitled to recover on them although same were obtained from person not entitled thereto (Oklahoma Supreme Court: *Weems v. Town of Covington*, 30 Pac. 2d, 462).

Statutory requirement that total vote on bond issue exceed 50 per cent of total vote at last preceding general election held constitutional (Washington Supreme Court: *Robb v. City of Tacoma*, 28 Pac. 2d, 327).

Charter Dissolution

Charter dissolution held mandatory on vote of majority of voting electors (Kentucky Court of Appeals: *Green v. Davis*, 68 S. W. 2d, 750).

Civil Service

Employees held removable for lack of funds or work (California District Court of Appeal: *Jenkins v. Board of Civil Service Commissioners, Los Angeles*, 30 Pac. 2d, 606; *Dawson v. Idem*, 30 Pac. 2d, 608).

Charter authority held prerequisite to valid rule of civil service commission requiring employees to file salary claim before suing (Washington Supreme Court: *Allard v. City of Tacoma*, 29 Pac. 2d, 698).

Condemnation Proceedings

City held not liable for damage to chattels removed from condemned building and stored in warehouse when owner refused to remove same, reasonable care having been used (Minnesota Supreme Court: *Dow-Arneson Co. v. City of St. Paul*, 253 N. W. 6).

Contracts

Statute regulating contracts for "public buildings" held valid and applicable to filtration plant building (Pennsylvania Supreme Court: *Tragesser v. Cooper*, 169 Atl. 376).

Department Organization

Ordinance giving Department of Accounts and Finance the keeping of all accounts, etc., upheld (Louisiana Court of Appeal: *State ex rel. City of Shreveport v. Dickson*, 150 So. 574).

Depositories

Village held not estopped to attack legality of deposits by Treasurer in bank not designated as depository, as required by statute (Nebraska Supreme Court: *State v. Plateau State Bank*, 253 N. W. 433).

Licenses

License tax imposed against gasoline dealers transporting in larger than 5-gallon containers, upheld (United States Circuit Court of Appeals, Eighth Circuit: *City of Sedalia v. Standard Oil Co.*, 66 Fed. 2d, 757).

Liquor Control

Constitutional provision giving municipalities liquor control held repealed by Prohibition and not revived by Repeal (Oregon Supreme Court: *City of Klamath Falls v. Oregon Liquor Control Commission*, 29 Pac. 2d, 564).

Municipal Garages

Although village violated its own ordinance by erecting a general municipal garage, plaintiff held to be limited to action for damages by delaying appeal until after garage was erected (New York Supreme Court, Appellate Division: *Brocoris Realty Corp. v. Village of Scarsdale*, 269 N. Y. Supp. 746).

Occupation Regulations

Ordinance regulating drilling of oil wells within city limits held enforceable although drilling was commenced before ordinance was adopted (Oklahoma Supreme Court: *Hud Oil & Refining Co. v. City of Oklahoma City*, 30 Pac. 2d, 169).

Official Bonds

Safety Director's sureties held not liable to obtaining judgment against Director for false imprisonment (Ohio Court of Appeals, Stark County: *Rohr v. Beamer*, 189 N. E. 125).

Official Tenure

Hospital superintendent held removable at will and hence not entitled to pay between date of removal and later date as of which he resigned (Georgia Court of Appeals: *Lentz v. City Council of Augusta*, 173 S. E. 460).

Pensions

Employee's right to refund of payments into pension fund, with interest, on being discharged held not subject to impairment by law reducing refund to 50 per cent, except as to payments made after amendment became effective (Florida Supreme Court: *Anders v. Nicholson*, 150 So. 639).

Public Utilities

Ordinance imposing license tax on light and power company upheld (United States Supreme Court: *Puget Sound Power & Light Co. v. City of Seattle*, 54 Sup. Ct. 542).

Bond issue held unnecessary to acquire electric plant to be paid for out of revenues of plant, secured by mortgage, but city indebted to constitutional limit cannot bind itself for application of revenue or imposition of reasonable rates (Alabama Supreme Court: *In re Opinions of the Justices*, 152 So. 901).

Sewers

City upheld in charging residents of outside territory $5 a year for sewer service and $5 for each connection made (Virginia Supreme Court of Appeals: *Board of Supervisors of Henrico County v. City of Richmond*, 173 S. E. 356).

Street Improvements

City receiving land for street held not empowered to exempt grantor from liability for future assessments of abutting property for improvement of street (Kentucky Court of Appeals: *City of Paducah v. Southern Roads Co.*, 68 S. W. 2d, 765).

Street improvement assessment proceedings held insufficient to charge street-railway company with cost of paving between tracks; company held not entitled to recover from city for certain paving done (Tennessee Supreme Court: *City of Knoxville v. Knoxville Power & Light Co.*, 68 S. W. 2d, 936).

Charter provision for apportioning cost of paving between city and abutting property held applicable to entire cost, including intersections and grading (Georgia Court of Appeals: *Hill v. City of Calhoun*, 171 S. E. 459).

Person specially injured held entitled to require removal of building unlawfully in street (Alabama Supreme Court: *McIntosh v. Moody*, 153 So. 182).

Sunday Closing

Merchant keeping grocery store open held to violate Sunday closing ordinance, although no grocery sales were made, store being opened to sell meat (Mississippi Supreme Court: *City of Pascagoula v. Henley*, 153 So. 392).

Ordinance barring Sunday movies held valid and violated, although part of proceeds are devoted to charity (Georgia Court of Appeals: *Thompson v. City of Atlanta*, 173 S. E. 193).

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H. F. Reilley, General Manager, California Fireproof Storage & Transfer Co.

125,000 Miles . . . The Chevrolet 1933 tractor-truck I am now operating has never stopped in 125,000 miles over a period of 11 months and is now running on its original rings. I have had the valves ground twice. I have experienced a 12-mile-per-gallon gas consumption over this period. Within the next few days I will give you an *order for a new 1934 model* for immediate delivery.

H. N. Craig, Merchants Parcel Delivery Co., Terre Haute, Ind.

100,000 Miles . . . I am enclosing a photograph of one of the Chevrolet fleet I bought in 1929. This truck has gone over 100,000 miles, at the present time is covering a route of 100 miles a day. Because of such performance, *I have placed an order for 12 more.*

G. L. Scheer, Scranton, Pa.

150,000 Miles . . . The 1929 Chevrolet truck I am trading today has been driven more than 150,000 miles in 4½ years. Nothing was ever done to the motor except the replacement of a coil. *The 1934 Chevrolet truck I am buying today is our 9th one.*

C. R. Bevers, White Star Laundry, Durham, N. C.

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TRUCKS

Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

The Texas Supreme Court Upholds Zoning

Texas Municipalities for July, 1934, contains an article, entitled as above, by Hugh S. Grady, City Attorney of Dallas, which gives the status of zoning in that state so well, that it is reprinted here in its entirety:

"The cases of *Lombardo v. City of Dallas* and *McEachern v. Town of Highland Park*, recently decided by the Supreme Court of Texas, are the first cases to come before that Court involving the constitutionality and construction of what is known as a comprehensive zoning ordinance duly enacted in pursuance to specific legislative authority. In both cases the Supreme Court upheld, for the first time in Texas, the validity of such legislation. The decision in the *Lombardo* case marks the culmination of 19 years of effort on the part of the city of Dallas to zone.

"In 1915 the City Commission enacted what it termed a zoning ordinance which defined a residential district and provided that anyone seeking to construct a building for business purposes in a residential district must obtain the consent of three-fourths of the property owners within a radius of 300 feet from the center of the proposed building. This ordinance was attacked, and in the case of *Spann v. City of Dallas*, 235 S. W. 513, the Supreme Court of Texas in 1921 held, in very broad language, that the Bill of Rights of the Texas Constitution prohibited zoning as an unlawful invasion of the property rights of the individual. The Court also held that the ordinance was invalid for a number of other reasons, among which was that it sought unlawfully to delegate the legislative authority of the governing body in the provision requiring the consent of the neighbors in order to construct a business building in a residential neighborhood. The decision in the *Spann* case was the authority under which the Court of Civil Appeals at Dallas held subsequent so-called zoning ordinances invalid. In several cases the Court of Civil Appeals declared that the decision in the *Spann* case was controlling and declined to sustain the validity of any such ordinances. The decisions in all of these cases are probably correct, for the reason that the ordinances therein construed did not involve the principle of comprehensive zoning nor were they enacted under specific legislative authority. None of them contained appropriate safeguards against arbitrary and unreasonable exercise of governmental power.

"The last expression of the Supreme Court in dealing with an ordinance of the same character as is condemned in the *Spann* case is found in the case of *Continental Oil Co. v. Wichita Falls*, 42 S. W. (2d) 236, wherein the Court said:

"'We are passing upon the single question of that particular ordinance's validity and not upon any other. What is here said has no reference to so-called zoning statutes and zoning ordinances and we express no opinion thereon.'

"This decision, like that in the *Spann* case, adheres to the doctrine that zoning as thus attempted bore no relation to the police power.

"However, in 1927 the Legislature enacted a statute specifically authorizing cities to zone, thereby definitely recognizing that zoning does bear a rational relation to the welfare and comfort of the community and is a proper subject of police regulation. In pursuance of the powers granted under the statute, the city of Dallas adopted the comprehensive zoning ordinance involved in the *Lombardo* case. This ordinance is, therefore, quite different in its general aspects from the ordinances which have heretofore been passed upon by the Supreme Court and the various Courts of Civil Appeals. It is based upon specific legislative authority and is comprehensive in its nature in that it zones the entire city, whereas the old ordinances were not authorized by legislative enactment and were piecemeal in their nature.

"This comprehensive zoning ordinance is not, like the old ordinances, based upon the theory of consent by the property owners. It was adopted after notice and a hearing before a zoning commission and notice and hearing before the governing body, thereby affording every property owner in the city ample opportunity to appear and be heard. The old ordinances were adopted without notice or hearing to the property owners. They failed to provide a remedy by which a property owner could protect himself against arbitrary and unwarranted action, whereas the present ordinance affords an appeal from the finding of the administrative officers to a board of adjustment, and the enabling act provides for a court review upon application for a writ of certiorari. The old ordinances did not provide a means of changing zoning classifications by amendment, whereas the present ordinance provides a specific method to accomplish this result. The old ordinances provided no safeguards against unnecessary harshness or unfairness. The present ordinance authorizes appropriate adjustments and makes the operation of the law flexible.

"Both the legislative enabling act and the ordinance involved in the two cases herein mentioned were modeled after the uniform Zoning Enabling Act and ordinance prepared by a committee on zoning, appointed by the United States Secretary of Commerce, and are practically the same in their general terms and provisions as those which have been sustained throughout the country.

"An ordinance quite similar to the one involved in these cases was, for the first time, sustained by the Supreme Court of the United States in 1926 in the famous case of *Euclid v. Ambler Realty Company*, 272 U. S. 365. Subsequent to the *Euclid* case, that Court has sustained comprehensive zoning in the following cases:

State v. Roberge, 278 U. S. 116;
Zahn v. Board of Public Works, 274 U. S. 325;
Gorieb v. Fox, 274 U. S. 603;
Nectow v. City of Cambridge, 277 U. S. 183.

"The rationale of the decisions sustaining zoning ordinances is that the practical application of zoning presents a question of fact depending upon the circumstances surrounding any particular piece of property. Theoretically every zoning ordinance should be flexible enough to prevent confiscation of property.

"The decision in the *Lombardo* case brings Texas law into line with that of about 40 states of the Union in which comprehensive zoning ordinances, similar to that adopted by the city of Dallas, have been sustained. Such legislation has been upheld also in the District of Columbia in the case of *Larrabee v. Bell*, 10 Fed. (2d) 986, and in the provinces of Ontario and Manitoba, Canada, in the cases of *Toronto v. Saluay*, 49 Dom. L. Rep. 473 and in re: *Maycock*, 24 Man. 649. In most of the jurisdictions herein mentioned where zoning ordinances similar to the one involved in the *Lombardo* case have been held to be within the scope of the police power, the state constitutions contain practically the same limitations and safeguards with reference to private property as those found in the Texas Constitution. In its pronouncement, therefore, the Supreme Court of Texas has but followed the beaten pathway that has been traveled by most American courts in their recognition of the necessity of cities having ample power to deal with urban development under modern conditions."

Zoning Ordinance—Annexed Territory

ILLINOIS.—*City of Highland Park v. Calder*, 269 Ill. App. 255.—On the legal annexation of territory to a city, all of the law and ordinances applicable to the city, including the zoning ordinance, become binding and effective upon the annexed territory without any further act on the part of the city.

Zoning Ordinance—Reasonableness

ILLINOIS.—*Merrill v. City of Wheaton*, 190 N. E. 918 (Supreme Court, April 21, 1934).—Section 3 of the zoning ordinance of the city forbids the use, erection or alteration of any building within any "A" residence district except, in part, for the following uses: (1) single-family dwellings; (5) boarding and rooming houses conducted in private homes where

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not more than 16 persons besides the family of the boarding or rooming house keepers are furnished board, and not more than 12 persons, besides such families, are furnished with rooms.

The plaintiff Merrill seeks to remodel his one-family house, so as to make it accommodate two families. The city refuses to allow this to be done, on the ground that in an "A" district, in which the property is situated, this is forbidden by the zoning ordinance; and the plaintiff, in this action, asks that the city be restrained from interfering with such remodeling because the section of the ordinance is unreasonable and therefore unconstitutional and void. It appears that the block in which plaintiff's property is located already contains eight residences used as two-family and eight occupied as one-family residences.

The Court holds that this section of the ordinance is unreasonable and void, and that therefore the plaintiff may remodel his building as he wishes to do. Little can be said in favor of a provision by which the plaintiff's next-door neighbor might use his dwelling to accommodate 28 persons, but plaintiff could not remodel his house for the use of perhaps only four persons—two in each family.

Reasonableness

NEW JERSEY.—*Guaranty Construction Co. v. Town of Bloomfield* (Supreme Court, July 21, 1933), 168 Atl. 34.—An amendment to a zoning ordinance adding one isolated lot surrounded by a residential zone to a business district half a mile away is void as violating the statute requiring a zoning ordinance to create districts suited to the purpose of the act.

MUNICIPAL AND CIVIC PUBLICATIONS

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Grade Separation

"New Developments in Grade Separation Structures" is an article by Charles P. Disney, Bridge Engineer, Central Region, Canadian National Railways, Toronto, Ont., which appeared in the April, 1934, issue of the *Journal of the Western Society of Engineers* and has been reprinted in a 12-page illustrated pamphlet, by the Portland Cement Association. In presenting this study of structures carrying railways over streets and highways, its editor calls attention to the features of low cost, shallow decks, simple construction and easy maintenance, and says: "The idea of fastening the rails to the concrete deck may not be orthodox, but Mr. Disney says it seems to work. At least it has in the six types described in this paper." (Apply to Portland Cement Assn., 33 W. Grand Ave., Chicago, Ill.)

Salaries

Tables giving "Basic Salaries That Prevail in Fire Departments in the United States and Canada, January, 1934," occupy 9 pages in the April, 1934, issue of the *International Fire Fighter*. These tables give the population of the place, the number of men in the department, and the salaries of chief, deputy or assistant chief, district or battalion chief, captains, lieutenants, 1st, 2d, 3d year and maximum salaries of the firemen, and salaries of master mechanics, engineers, chauffeurs, electricians, fire-alarm operators, and secretary to chief. (Apply to *International Fire Fighter*, A. F. of L. Bldg., Washington, D. C.)

"Compensation of County and City Employes in New Jersey" is a study and analysis by the New Jersey Taxpayers Association (Arthur Richards, Research Director), issued in 18 mimeographed pp., including charts and tables. It is a statistical tabulation of the salaries paid in 1933, and not a comprehensive analysis of the classification and compensation of public positions in the counties, cities and boroughs of New Jersey. 25c. (Apply to New Jersey Taxpayers Association, Broad Street Bank Bldg., Trenton, N. J.)

Municipal Administration

The Colorado Municipal League has published "A Survey of the General Civic Conditions of Colorado Cities Having a Population of 2,000 or More," prepared by Edison H. Cramer, Field Consultant of the League. A pamphlet of 31 pp., presenting in tables and charts data showing the service given by police, fire, street, health, park, water, and street lighting departments, and libraries; election data, mill levies, bonded indebtedness, municipal receipts and disbursements; and a general summary of service rendered, and cost, for each of the seven municipal activities. Apply to the League, Univ. of Colorado, Boulder, Colo.)

Ordinances

The Municipal Reference Library, 1005 City Hall, Chicago, Ill., will lend for copying its latest list (No. 29, June 22, 1934) of references to ordinances introduced in or passed by the City Councils of large cities. Its title is "What the City Councils Are Doing." 9 typewritten sheets. (Apply to the Library.)

Real Estate Appraisal

Since Ivan A. Thorson wrote his "Real Estate Economics and Simplified Appraisal System," it has gone through several editions in which it has been amplified and improved and brought up to date. In its latest edition, "The New Simplified Appraisal System," a course is presented in loose-leaf form so that modifications and additions may be made to any chapter. These are made without charge. New chapters, discussing other phases of appraising, and showing new developments, will be added from time to time. The first ten chapters, now ready ($3.00), constitute a complete elementary course in land economics and appraising. The complete twenty chapters, presenting an advanced course, will be furnished for $5.00. The author is an instructor in real estate subjects in the Extension Division of the University of California. (Apply to Realty Research Bureau, 2286 W. 23rd St., Los Angeles, Calif.)

"Mandatory Expenditures of Local Governments in Pennsylvania" is a dissertation in Political Science presented by Edward Weamer Carter to the Faculty of the Graduate School of the University of Pennsylvania in partial fulfillment of the requirements for the degree of Doctor of Philosophy. 1934. Where local governments have not the funds to fulfill their mandatory functions, such as highway maintenance, poor relief, school finance, and salary provision, the situation cries for relief by modification of inflexible statutes and increase of the powers of local budgeting authorities. 189 pp. (Apply to the author, Wharton School, University of Pennsylvania, Philadelphia, Pa.)

Taxation

"What Do We Want from Taxes?" asks Harold S. Buttenheim, in the August number of the *Survey Graphic*. A 4-page reprint of this paper has been issued. The author argues against unwise slashing of governmental expenditures for education, safety, sanitation, recreation, and other beneficial activities of the modern municipality, and presents an outline of the civilization now attainable: the elimination of slums and blighted areas; sunny, sanitary homes; well-lighted, beautiful streets, safe for motorists and pedestrians; preventive public health services and adequate hospitalization; freedom from the fear of want; these ends to be reached, not through Fascism or Communism, but through a just and scientific system of taxation. (Apply to the author, editor of THE AMERICAN CITY, 470 Fourth Ave., New York.)

"The Relation of the State Sales Taxes to Cities" is an analysis of the relation of the various state sales taxes to cities, as regards utility sales, city purchases, and city sharing of revenues. It has been prepared by Paul V. Betters, Executive Director, American Municipal Association, and is Report No. 91 of the Association, issued May, 1934. "Virtually none of the sales tax acts provides for any allocation to, or sharing with, cities of the proceeds of the tax." 8 pp. 15c. (Apply to the Association, Drexel Ave. and 58th St., Chicago, Ill.)

Housing

Recent material issued by the Washington Commitee on Housing, now in considerable demand, includes the following mimeographed publications: "A Housing Program, by John Ihlder, March, 1934, 22 pp., 15c; "Memorandum on a Housing Program," 2 pp., 5c; "Some Housing Questions and the Answers," May, 1934, 7 pp., 8c; "Measuring Rod for Housing Projects," by John Ihlder, 8 pp., 5c. (Apply to Washington Committee on Housing, 902 Barr Bldg., Washington, D. C.)

Traffic

"Short Count Traffic Surveys and Their Application to Highway Design" is the title of a 46-page pamphlet by Dr. Miller McClintock, Director of The Albert Russel Erskine Bureau for Street Traffic Research, Harvard University, published by the Portland Cement Association. In recognition of the importance of traffic data in relation to street and highway planning and pavement design, this study explains the short count method of making inexpensive, reliable traffic surveys, presenting and interpreting the results of the surveys and applying the data to highway planning and to the economical structural design of pavements; also the making of traffic forecasts. The short count method is based on the fact that the percentage of total daily traffic occurring in any given hours is approximately constant at different points along the same route, or on routes of the same character in the same district. (Apply to the Portland Cement Association, 33 W. Grand Ave., Chicago, Ill.)

Final revised editions of the following publications approved by the Fourth National Conference on Street and Highway Safety, held in Washington, D. C., May 23-25, 1934, are available: Act I of the Uniform Vehicle Code—"Uniform Motor Vehicle Administration, Registration, Certificate of Title and Anti-Theft Act"; Act II—"Uniform Motor Vehicle Operators' and Chauffeurs' Licens: Act"; Act III—"Uniform Motor Vehicle Civil Liability Act"; Act IV—"Uniform Motor Vehicle Safety Responsibility Act"; Act V—"Uniform Act Regulating Traffic on Highways"; "Model Municipal Traffic Ordinance," including "Model Traffic Administrative Ordinance"; "Manual of Uniform Traffic Control Devices for Streets and Highways (Signs—Signals—Marking and Islands)"; "Guides to Traffic Safety," a summary of methods based on experience for dealing with current pressing problems of street and highway safety; "Summary of Proceedings of Fourth National Conference on Street and Highway Safety." (Apply to National Conference on Street and Highway Safety, Department of Commerce, Washington, D. C.)

Police

The "Outline of Instruction, Police Training School, June 18-23, 1934, Wichita, Kansas," has been published (June 15) as Bulletin No. 100 by the League of Kansas Municipalities. 158 mimeographed pp. and 72 printed pp. $4.00. Eighty-two officers received diplomas from the School, which was under the direction of Chief O. W. Wilson, of Wichita. (Apply to John G. Stutz, Executive Secretary of the League, Lawrence, Kans.)

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Government and Administration

The "Minnesota Year Book, 1934" (Volume V) has been published by the League of Minnesota Municipalities in conjunction with the Municipal Reference Bureau of the University of Minnesota. 505 pp. Charts, tables, views. It presents the framework of the state government—legislative, judicial, executive and general administration; local government—county, city, village, township, school district; the details of taxation and finance; public utilities—electricity, water, water and sewage treatment, gas, central heating; fire insurance ratings; directory of officials and organizations; population statistics. $5.00. (Apply to the League, University of Minnesota, Minneapolis, Minn.)

Regional Planning

Three reports for 1933 made by the Monroe County (N. Y.) Regional Planning Board are available for distribution to those who are particularly interested in the Board's type of planning—the study of a prescribed area, first by sections, then ultimately as a whole, in order to build upon a known base a future plan to scientifically direct the growth of communities in an orderly and economically sound fashion—the opposite of a policy of isolation. These mimeographed reports include the Report of the Board for 1933, with exhibits from "A Financial Report for the Town of Gates as a Basis for Long-Term Financial Planning or Budgeting," which is issued as a separate report. The general Report of the Board also includes "A Progress Report for an Industrial Port Development," by the Rochester-Monroe Joint Harbor Survey, also the 1933 Report of the Lake Ontario Country Association of Western New York, and a report on "The Rural Homes of City Workers and the Urban-Rural Migration," by Leland B. Tate, New York State College of Agriculture, cooperating with the Monroe County Regional Planning Board. The third separate report is "A Planning Study of Gates," and it includes histories of Monroe County and the municipalities of Rochester and Gates. Many tables, maps and graphs. Each of the three reports will be sent upon request after the receipt of the postage—35c each. To libraries and planning institutions the three reports will be sent by express collect. (Apply to the Monroe County Regional Planning Board, 405 Terminal Bldg., Rochester, N. Y.)

The Michigan Commission of Inquiry into County, Township and School District Government has published a pamphlet of 27 pages, containing the following studies of local government in Michigan: "Population Trends," by George T. Ragsdale and Lent D. Upson, of the Detroit Bureau of Governmental Research; "Natural Community Areas," by J. F. Thaden, Assistant Professor of Sociology, Michigan State College; and "Rural Land Zoning," by P. A. Herbert, Professor of Forestry, Michigan State College. December, 1933. (Apply to Lent D. Upson, Director of Inquiry, State Commission of Inquiry, 935 First National Bank Bldg., Detroit, Mich.)

The first number of *Planning News* has been issued (July, 1934) by the Pacific Northwest Resources Board, which is District No. 11 of the National Resources Board, successor to the Pacific Northwest Regional Planning Commission. The regional board is composed of representatives of each of the planning organizations in Montana, Idaho, Oregon and Washington, the district chairmen of the National Resources Board, and others. This mimeographed publication will come at intervals as a progress report on the work being done by the consultants in the region, on the principal activities of the state planning boards, and local activities and coordinated efforts. 12 pp. in this first number. (Apply to Pacific Northwest Resources Board, 220 Federal Court House, Portland, Ore.)

The New York State Planning Board has issued a mimeographed report of its Committee on Recreation (Henry F. Lutz, Chairman). It includes: "Principles Governing the New York State Park and Parkway System and Rules for the Extension of the System Adopted by the State Council of Parks"; "Law Relative to Signs and Billboards within the Adirondack Park"; "Proposed State Regulation of Billboards Along Highways"; "Highway Tree Planting"; "Forest Preserves and Historic Sites"; "The Relation of Recreation to Wild Life"; also to "Reforestation and Use of Submarginal Farm Areas"; "Preservation of Natural Beauty (Including Roadsides) and Preservation of Opportunity for Public Enjoyment of Streams, Lakes and Shores"; "Summer Resorts and Summer Homes Developments." The Board has also issued a 13-page bulletin (No. 11) on "Some State Planning Problems," including: Interrelation of State and National Planning; Submarginal Farm Land; Reforestation; Water Resources; Vacation of Resort Regions; A New Public Domain. (Apply to New York State Planning Board, 353 Broadway, Albany, N. Y.)

Municipal Liability

The *Harvard Law Review* has reprinted, from its Vol. XLVII, No. 7, "Quasi-Contractual Liability of Municipal Corporations," by C. W. Tooke. Since the question is one of unusual difficulty in which conflicting theories call for a state-by-state study of the law of public corporations and the legal decisions on the subject, the present study seeks only to indicate those conclusions of the courts that are practically uniform, to point out the theories underlying the conflicting decisions, and to make certain tentative statements of the rules that seem to be established: "We may say that a municipal corporation will be held liable in quasi-contract upon the same principles as a private corporation unless, either directly or impliedly, recovery in the given case is forbidden by the constitution and statutes of the jurisdiction." 30 pp. (Apply to the Harvard Law Review Association, Cambridge, Mass.)

County Government

At the Arkansas Peoples' Conference on Government, held at Horseshoe Lake, Ark., on June 11, 1934, a paper on "County Consolidation" was read by J. N. Heiskell, editor of the *Arkansas Gazette*, of Little Rock. "The preservation and the vindication of local government demand larger, stronger counties with more efficient and economical administration, county governments that can give greater public service and can in greater measure enjoy the confidence and respect of a loyal and devoted, but alert and vigilant, body of citizens." Mimeographed. 17 sheets. (Apply to the author.)

Municipal Finance

"The Finances of New York City" is the title of Report No. 350 (June, 1934) by the Municipal Service Department of Dun & Bradstreet, Inc. (copyrighted). The report has been compiled by T. David Zukerman, formerly staff member of the New York Bureau of Municipal Research and Director of the Political Research Bureau, who has been a close student of New York City's municipal affairs for many years. Twenty-five tables are included in connection with the text referring to them respectively. The broad divisions of the study are: Economic and Social Factors; Government and Administration (including need for charter revision); Financial Analysis (the present situation); The Debt. (Apply to Dun & Bradstreet, Inc., 290 Broadway, New York.)

Public Works

The *Public Works Engineers' News Letter* is published monthly by the American Society of Municipal Engineers and the International Association of Public Works Officials. The August issue (Vol. I, No. 2) tells of the congress of municipal engineering and public works officials to be held in Rochester, N. Y., September 25-28, and also gives many interesting items about individuals and activities in the broad field of public engineering. 4 photo offset pp. Donald C. Stone is the editor. (Apply to the publication, at 850 E. 58th St., Chicago, Ill.)

Municipal Accounting

"Tentative Outline of a Suggested Procedure for a Detailed Municipal Audit" is Bulletin No. 2 of the National Committee on Municipal Accounting, 850 E. 58th St., Chicago, Ill. Published May, 1934. 26 pp. $1.00. (Apply to the Committee.

Public Administration

"A Directory of Organizations in the Field of Public Administration, 1934" has just been prepared by the Public Administration Clearing House (850 E. 58th St., Chicago, Ill.) This second edition includes 484 national associations, about half of which are composed of public officials; 1,243 state organizations, 85 regional organizations, and 89 Canadian organizations. 192 pp.; paper-bound. $1.00. (Apply to Public Administration Service, address above.))

Planning

The Town Planning Review for July, 1934, is rich in interesting articles: "Educational Buildings—Their Relation to the Town Plan," by W. Dougill; "American Small Towns: I.—Kingsport, Tenn.," by John Nolen; "Urban Improvement Schemes: I.—The Headrow, Leeds," by W. S. Cameron; "The English Village: V.—Melling," by W. Dougill; "Sydney, New South Wales, Australia," by W. Hoy and W. H. Morris; "Procedure under the Town and Country Planning Act, 1932," by John J. Clarke; "Two School Designs," by W. D. Many reviews of publications are also given. Single copies, 4s.; yearly subscription (4 numbers), 15s. Published by the University Press of Liverpool. (Apply to the American agents, G. E. Stechert & Co., 151-5 W. 25th St., New York.)

A mimeographed monthly bulletin on "Pennsylvania Planning and Zoning" is being published by the Pennsylvania Department of Internal Affairs in cooperation with the Pennsylvania Association of Planning Commissioners. The first number was issued in July, 1934. It contains an 8-page article entitled "Is Slum Clearance a Vital Problem in Small Cities?", by Frederick Bigger, Chairman, Pittsburgh City Planning Commission, and Past President, American City Planning Institute. The question is vigorously answered by a "Yes," with explanations. The August issue reports the activities of the City Planning Commissions in Allentown, Meadville, New Castle, Bethlehem, and Johnstown, as submitted at the annual convention of the Pennsylvania Association of Planning Commissions, in New Castle, June 11-12, 1934. (Apply to Edward Flickinger, Chief, Division of City Planning and Landscape Architecture, Department of Internal Affairs, Harrisburg, Pa.)

A Statement for Chambers of Commerce on "New Opportunities for City Planning" has been issued by the Construction and Civic Development Department Committee of the Chamber of Commerce of the United States, August, 1934. The revival of city planning is recognized in this statement, and chambers of commerce are urged to take an active interest in making city planning an effective part of local government procedure, by giving it official status through city planning commissions. This 8-page pamphlet is definite and concrete in presenting the need, the opportunities and the means of establishing this method of preventing waste and insuring progress. (Apply to Chamber of Commerce of the United States, Washington, D. C.)

Playgrounds

"Space Requirements for the Children's Playground" is a statement prepared by George D. Butler of the staff of the National Recreation Association, after consultation with Lee F. Hanmer and Clarence Arthur Perry, of the Department of Recreation, Russell Sage Foundation, who developed the play space standards included in the reports of the Regional Plan of New York and Environs. 22 pp. Illustrated. 25c. (Apply to National Recreation Association, 315 Fourth Ave., New York.)

Other Reports Received

CHICAGO, ILL.—Annual Report, Retirement Board: "Policemen's Annuity and Benefit Fund." 1933. 23 pp. (Send 5c to Municipal Reference Library, Chicago.)

DELAWARE.—State Board of Housing. June, 1934. 33 pp.

DETROIT, MICH.—"The Government of the Detroit Metropolitan Area," by J. M. Leonard and Lent D. Upson, of the Detroit Bureau of Governmental Research. A report to the Michigan Commission of Inquiry into County, Township and School District Government, May 1, 1934. 121 pp.

HOUSTON, TEXAS.—Annual Report, Police Division, Department of Public Safety, 1933. 42 mimeographed pp.

MICHIGAN.—"Local Public Works Administration in Michigan," by Roger L. Morrison and Walter C. Sadler, of the University of Michigan, and L. J. Rothgery, of Michigan State College. A report to the Michigan Commission of Inquiry, February, 1934. 15 pp.

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CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance other than local)

SEPTEMBER 3-6.—PASADENA, CALIF.
American Public Health Association. Annual meeting. Acting Executive Secretary, Dr. Kendall Emerson, 50 West 50th Street, New York.

SEPTEMBER 5-6.—PASADENA, CALIF. (150)
California Sewage Works Association. Annual convention. Secretary, Prof. E. Reinke, Life Sciences Building, University of California, Berkeley, Calif.

SEPTEMBER 11-13.—MURRAY BAY, QUE.
Canadian Good Roads Association. Annual convention. Secretary-Treasurer, George A. McNamee, New Birks Building, Montreal, Que.

SEPTEMBER 11-13.—AKRON, OHIO. (200)
Ohio State Police Chiefs Incorporated. Annual convention. Secretary, E. G. Krause, 1020 Guardian Building, Cleveland, Ohio.

SEPTEMBER 12-14.—FORT WAYNE, IND. (500)
Municipal League of Indiana. Annual convention. Executive Secretary, S. E. Spurgeon, Municipal League Review, Kokomo, Ind.

SEPTEMBER 15-16.—ASBURY PARK, N. J. (500)
New Jersey State League of Municipalities. Annual convention. Executive Secretary, S. S. Kenworthy, Trenton Trust Building, Trenton, N. J.

SEPTEMBER 16-21.—LOUISVILLE, KY. (300)
American Institute of Park Executives and the American Park Society. Annual convention. Executive Secretary, William H. Walker, 2234 Inglewood Place, South Bend, Ind.

SEPTEMBER 17-21.—HOUSTON, TEXAS. (350)
American Prison Association. Annual congress. General Secretary, E. R. Cass, 135 East 15th Street, New York.

SEPTEMBER 17-19.—SANTA FE, N. MEX.
American Water Works Association—Rocky Mountain Section. Annual meeting. Secretary-Treasurer, B. V. Howe, 437 State Office Building, Denver, Colo.

SEPTEMBER 17-19.—PHILADELPHIA, PA.
Municipal Finance Officers' Association of the United States and Canada. Annual convention. Executive Director, Carl H. Chatters, 850 East 58th Street, Chicago, Ill.

SEPTEMBER 18-19.—HERINGTON, KANS. (250)
Kansas Association of Municipal Utilities. Annual convention. Secretary-Treasurer, L. C. Angevine, Superintendent of Water and Electric Department, McPherson, Kans.

SEPTEMBER 18-21.—BOSTON, MASS.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 19-20.—STAUNTON, VA. (300)
League of Virginia Municipalities. Annual convention. Executive Secretary, Morton L. Wallerstein, 408 Travelers Building, Richmond, Va.

SEPTEMBER 20-21.—DULUTH, MINN.
American Water Works Association—Minnesota Section. Annual meeting. Secretary-Treasurer, Ronald M. Finch, Wallace & Tiernan Co., Inc., 414 Flour Exchange, Minneapolis, Minn.

SEPTEMBER 21-22.—HAGERSTOWN, MD. (200)
Eastern Association of Fire Chiefs. Annual convention. Secretary, F. E. Soule, Coatesville, Pa.

SEPTEMBER 24-27.—ROCHESTER, N. Y.
American Society of Municipal Engineers. Annual convention. Secretary, C. W. S. Sammelman, 4359 Lindell Boulevard, St. Louis, Mo.

SEPTEMBER 24-28.—CLEVELAND, OHIO.
American Transit Association. Annual convention. General Secretary, Guy C. Hecker, 292 Madison Avenue, New York.

SEPTEMBER 24-27.—LOUISVILLE, KY. (400)
Association of American Cemetery Superintendents. Annual convention. Secretary, William B. Jones, Superintendent of Highwood Cemetery, Pittsburgh, Pa.

SEPTEMBER 24-27.—PASADENA, CALIF. (2,000)
League of California Municipalities. Annual convention. Executive Secretary, J. W. Charleville, 681 Market Street, San Francisco, Calif.

SEPTEMBER 24-27.—WASHINGTON, D. C.
International Association of Chiefs of Police. Annual convention. Secretary, George Black, Wilmington, Del.

SEPTEMBER 24-25.—MINOT, N. DAK. (150)
League of North Dakota Municipalities. Annual convention. Executive Secretary, Myron H. Atkinson, Bismarck, N. Dak.

SEPTEMBER 25-26.—WAUSAU, WIS.
American Water Works Association—Wisconsin Section. Annual convention. Secretary, L. A. Smith, Superintendent of Water Works, City Hall, Madison, Wis.

SEPTEMBER 26-28.—ROCHESTER, N. Y.
International Association of Public Works Officials. Annual convention. (Seneca Hotel.) Secretary, A. M. Anderson, 100 North La Salle Street, Chicago, Ill.

SEPTEMBER 29-30.—MEMPHIS, TENN.
National Public Housing Conference. Southern Regional Conference. Secretary, Miss Helen Alfred, 112 East 19th Street, New York.

OCTOBER, FIRST WEEK OF.—CHICAGO, ILL.
American Association of Engineers. Annual convention. Secretary, M. E. McIver, 8 South Michigan Avenue, Chicago, Ill.

OCTOBER 1-4.—BALTIMORE, MD.
Illuminating Engineering Society. Annual convention. General Secretary, D. W. Atwater, 29 West 39th Street, New York.

OCTOBER 1-5.—WASHINGTON, D. C. (600)
National Recreation Association. Annual congress. Administrative Secretary, Thomas E. Rivers, 315 Fourth Avenue, New York.

OCTOBER 1-5.—CLEVELAND, OHIO.
National Safety Council. Annual congress. Managing Director, W. H. Cameron, 20 North Wacker Drive, Chicago, Ill.

OCTOBER 1-5.—BOSTON, MASS. (400)
National Tax Association. Annual conference. Secretary, W. G. Query, Chairman, South Carolina Tax Commission, Columbia, S. C.

OCTOBER 2-3.—CLEVELAND, OHIO. (150)
Institute of Traffic Engineers. Annual meeting. Secretary-Treasurer, Hawley S. Simpson, 175 Fifth Avenue, New York.

OCTOBER 3-4.—ABILENE, TEXAS.
Texas Public Health Association. Annual meeting. Secretary, Lewis Bracy, State Board of Health, Austin, Texas.

OCTOBER 3-5.—ST. JOSEPH, MICH. (325)
Michigan Municipal League. Annual meeting. Director, Harold D. Smith, University of Michigan, Ann Arbor, Mich.

OCTOBER 4-5.—BROOKLINE, MASS.
Massachusetts Federation of Planning Boards. Annual conference. Secretary, Ernest B. Allen, 142 Berkeley Street, Boston, Mass.

OCTOBER 4-5.—SWAMPSCOTT, MASS. (160)
Massachusetts Police Association. Annual convention. Secretary, James F. Rogers, 338 Malden Street, Medford, Mass.

OCTOBER 4-5.—COLUMBUS, OHIO. (200)
Ohio Conference on Sewage Treatment. Annual convention. Secretary-Treasurer, W. B. Lockhart, Sewage Treatment Plant, Fostoria, Ohio.

OCTOBER 5-6.—BROOKLINE, MASS.
National Public Housing Conference. New England Regional Conference. Secretary, Miss Helen Alfred, 112 East 19th Street, New York.

OCTOBER 5-6.—ONEONTA, N. Y.
New York State Sewage Works Association. Annual meeting. Secretary-Treasurer, A. S. Bedell, State Department of Health, Albany, N. Y.

OCTOBER 10-12.—HASTINGS, NEBR. (500)
League of Nebraska Municipalities. Annual meeting. Secretary-Treasurer, C. E. Beals, 407 East 12th Street, Crete, Nebr.

OCTOBER 10-11.—WISCONSIN RAPIDS, WIS. (200)
Wisconsin Chiefs of Police Association. Annual meeting. Secretary, R. H. McCarty, Police Department, Kaukauna, Wis.

OCTOBER 11-12.—BUFFALO, N. Y.
American Water Works Association—New York Section. Fall meeting. Secretary, R. K. Blanchard, care Neptune Meter Co., 50 East 42d Street, New York.

OCTOBER 15-17.—ST. LOUIS, MO. (300)
International City Managers' Association. Annual convention. Executive Director, Clarence E. Ridley, 850 East 58th Street, Chicago, Ill.

OCTOBER 15.—PROVIDENCE, R. I.
New England Sewage Works Association. Annual meeting. Secretary, F. W. Gilcreas, Division of Chemistry and Research, New Scotland Avenue, Albany, N. Y.

OCTOBER 15-18.—WACO, TEXAS. (350)
Southwest Water Works Association. Annual convention. Secretary-Treasurer, Lewis A. Quigley, Fort Worth, Texas.

OCTOBER 18-20.—KNOXVILLE, TENN. (200)
American Forestry Association. Annual meeting. Executive Secretary, Ovid Butler, 1727 K Street, N. W., Washington, D. C.

OCTOBER 18-20.—SPRINGFIELD, ILL. (350)
Illinois Municipal League. Annual convention. Secretary, A. D. McLarty, Urbana, Ill.

OCTOBER 20-22.—CINCINNATI, OHIO. (50)
Conference of State Sanitary Engineers. Annual meeting. Secretary-Treasurer, R. E. Tarbett, U. S. Public Health Service, Washington, D. C.

OCTOBER 21-24.—CINCINNATI, OHIO. (300)
National Association of Commercial Organization Secretaries. Annual convention. (Netherland-Plaza Hotel.) Secretary-Treasurer, Glen B. Eastburn, Manager, Chamber of Commerce, Omaha, Nebr.

OCTOBER 22-24.—TOPEKA, KANS.
League of Kansas Municipalities. Annual convention. Executive Secretary, John G. Stutz, Lawrence, Kans.

OCTOBER 22-24.—ST. LOUIS, MO.
National Conference on City Planning. American Civic Association, Inc. Joint meeting. Secretary of the Conference, Flavel Shurtleff, 130 East 22d Street, New York. Secretary of the Association, Miss Harlean James, 901 Union Trust Building, Washington, D. C.

OCTOBER 24-27.—LONG BEACH, CALIF.
American Water Works Association—California Section. Annual convention. Secretary-Treasurer, J. E. Phillips, 207 South Broadway, Los Angeles, Calif.

OCTOBER 29-31.—ATLANTIC CITY, N. J.
Pennsylvania Water Works Association. Annual meeting. Secretary, F. Herbert Snow, 327 Telegraph Building, Harrisburg, Pa.

NOVEMBER.—ELIZABETH, N. C.
American Water Works Association—North Carolina Section. Annual meeting. Secretary, Prof. H. G. Baity, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 8-10.—OMAHA, NEBR.
American Water Works Association—Missouri Valley Section. Annual meeting. Secretary, Earl L. Waterman, University of Iowa, Iowa City, Iowa.

NOVEMBER 8-10.—CORAL GABLES, FLA.
Florida League of Municipalities. Annual convention. Secretary, E. P. Owen, Jr., 1709 Barnett National Bank Building, Jacksonville, Fla.

NOVEMBER 12-15.—SANTA FE, N. MEX. (350)
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 1222 National Press Building, Washington, D. C.

NOVEMBER 16-19.—WASHINGTON, D. C. (400)
American Country Life Association. Annual Conference. Executive Secretary, Benson Y. Landis, 105 East 22d Street, New York.

NOVEMBER 16-17.—ASBURY PARK, N. J. (400)
New Jersey Health and Sanitary Association. Annual meeting. (Hotel Berkeley-Carteret.) Secretary, Dr. Edward Guion, Box 418, Atlantic City, N. J.

JANUARY 16-18.—NEW YORK.
American Society of Civil Engineers. Annual meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

JANUARY 22-25.—WASHINGTON, D. C.
American Road Builders' Association. Convention and Exhibit. (Willard Hotel.) Engineer-Director, Charles M. Upham, 958 National Press Building, Washington, D. C.

JUNE.—PRAGUE, CZECHOSLOVAKIA.
International Housing Association. Congress. General Secretary, Prof. Franz Schuster, Hansa-Alee 27, Frankfort a/M, Germany.

Saves Both Ways

SAVES traffic accidents—because Police Motorcycles are the most effective means of traffic control.

Saves money for taxpayers—because Police Motorcycles cost far less in upkeep and manpower than police cars.

A double reason why most cities with good traffic-accident records are well equipped with Harley-Davidson Motorcycles.

Let your Harley-Davidson Dealer show you our latest police models, with radio equipment and new safety features. Send a postcard to us for literature.

HARLEY-DAVIDSON MOTOR CO.
Department M Milwaukee, Wis.

HARLEY-DAVIDSON
The Police Motorcycle

IDEAL
All-Steel
Three-Stall
VOTING
BOOTH

It takes time—but sooner or later the entire country will be equipped with secret-ballot booths like these—convenient to use, sanitary, durable, economical, easy to set up, easy to close up and store away in steel cases in a small space.

Write for illustrated booklet describing the IDEAL patented all-steel voting booth. Made in one, two, three, four and five stalls. *We also make Steel Ballot Boxes.*

Same booth as above, ready for storage in Steel case. Note the 12-inch wide Steel Shelves.

Ideal Voting Booth Company
Sullivan Indiana

WATCH DOG

WORTHINGTON

Built for the future...
on a foundation of
EXPERIENCE

AS a builder of water meters, this organization draws upon an uninterrupted experience of seventy-five years. *Result* . . . accuracy and durability to meet present and future requirements.

More than 3,200,000 Worthington and Watch Dog Meters are in use today.

WORTHINGTON-GAMON METER COMPANY
GENERAL OFFICES: HARRISON, NEW JERSEY
District Offices or Representatives in Principal Cities

WORTHINGTON-GAMON

NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

A TYPICAL INSTALLATION OF A REDFLEX FLASHING SIGNAL

Self-Illuminated Flashing Warning Signals

A new type of flashing signal has been brought out by the Redflex Signal Co., East Cleveland, Ohio, which is self-illuminated, wholly independent of headlight reflections, and visible at ample distance from the point of hazard, and by periodic flashing forcibly compels the attention of the approaching driver.

The flashing device is on the magnetic principle, simple and rugged in construction, having only three moving parts, on which there is practically no load. It is sealed in its case to exclude dust and moisture, is independent of changes in temperature, humidity or vibration, and can be mounted in any position. Precious metal contacts assure certainty of operation, and slow-moving parts and quality construction insure service over a long period of years. A signal face plate bearing the desired message, mounted securely upon a housing, forms a weatherproof cap over the mounting post. The housing is designed to enclose a standard 8⅝-inch traffic signal lens, with a special super-reflector, and an accurately focused Mazda lamp. In the lower part of the housing is the flasher mechanism, which is installed in a socket similar to a lamp socket. Immediately below the housing, in the supporting post, is placed a set of four No. 6 dry cells, connected in tandem, and provided with a combined handle and contactor at the top. Merely sliding this battery down into the pipe establishes one battery connection, and placing the housing on top of the pipe establishes complete circuit connections to flasher and lamp. No wiring whatever is necessary. Tamper-proof keyed set screws fasten the housing firmly in position and leave the entire exterior surface weatherproof, smooth, and safe from vandalism. A heavy guard protects the lens without appreciable diminution of its warning light. Ten feet of supporting pipe, furnished with the unit, gives an elevation of 8 feet to the center of the flashing lens, making it safely visible over parked automobiles, irrespective of their position.

For locations which require that the warning signal be fixed directly upon an obstruction, this company has developed a self-contained unit, consisting of a weatherproof case provided optionally with pipe or bracket supports, for attachment directly to bridge columns, truss and posts, gates, safety zone standards, etc. These self-illuminated warning signals are simple of design, economical in operation and easy to service. It is claimed that two of these can be installed at an intersection at a cost, in most localities, of approximately one-fifth of that of an automatic signal.

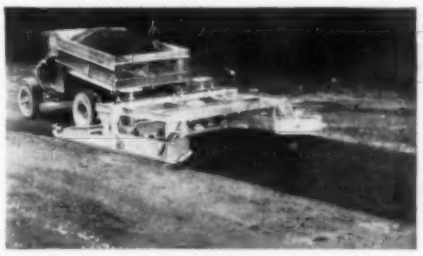
Turning Night Time into Play Time

Benjamin floodlights are being used quite extensively as lighting equipment for night football, which requires high intensity illumination of a uniform and well-diffused character over the entire playing field so that players are plainly visible to the spectators in the stands and to each other from any position, without glare and uneven lighting.

Benjamin floodlights, made by the Benjamin Electric Manufacturing Co., Des Plaines, Ill., are manufactured in various sizes and types, including play area floodlights especially suitable for floodlighting sport, recreational and similar areas, which are highly efficient large porcelain-enameled steel reflectors with an inner reflector of oxidized aluminum and which provide a uniform illumination on the ground areas to the front and sides as well as improving illumination at points farthest from the unit. The Ellipto-Lite floodlight is a smaller size open type floodlight of elliptical shape for floodlighting smaller areas, and floodlights have been developed for lighting swimming pools, tennis courts, etc.

A New Device for Laying Secondary Roads

A new device known as the Vibro-Spreader has been brought out by The Jaeger Machine Co., Columbus, Ohio. This new unit has a screed vibrated at 3,500 rpm for vibratory spreading, striking-off and finishing, 15-foot long straight-edge sled runners which act as forms, equalize the high spots and smooth the surface, and a telescoping main frame used in combination with the screed extension wings to give 9- to 14-foot width adjustability. The new machine spreads gravel, rock, slurry, armor plate, macadam and hot or cold bituminous mixes, and may be used for leveling binder and top course any width from 9 to 14 feet and any thickness between 1 and 8 inches. On two- and three-lane work, the clean-up or flushing wings insure proper blending of strips and uniform density.



THE NEW JAEGER VIBRO-SPREADER

The vibration of the screed, which is also imparted to the sled runners, keeps materials plastic and the load alive, reducing the draw-bar pull and making possible much faster spreading. Once over with the Vibro-Screed places rock, Macadam and bituminous mixes, hot or cold, are placed ready for rolling as fast as they can be fed.

A SOFT-BALL FIELD ILLUMINATED BY BENJAMIN FLOODLIGHTS

ROT-PROOF, EVEN OVER GROUND FLOOR CONCRETE! . .

Here *was* a problem! A basement room with concrete floor. Dampness had even caused baseboards to rot in spots. Room was needed . . . badly! Mastipave was laid . . . problem instantly solved! For four years, during the rainy season, water has stood in one corner of the room . . . but the Mastipave has not been injured . . . remains good-looking through it all! Rot-proof . . . vermin-proof . . . slip-proof, even when wet . . . no other floor covering could have tackled this job successfully.

Write for Booklet AC

THE PARAFFINE COMPANIES, INC.
475 Brannan St., San Francisco, Calif.

THE COTT-A-LAP CO.
Somerville, New Jersey

440 Branches in Principal Cities

THE LOW-COST, LONG-LIFE FLOOR COVERING

MASTIPAVE

"HVASS" SPREADERS

Conquer Slippery Pavements

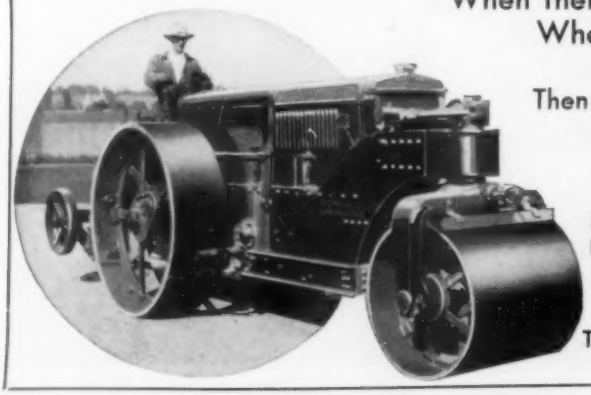
Spread full width street or road at one time or any part thereof.

—SPREAD—
SAND, ASHES OR CINDERS

Can be quickly attached or detached.

Write for descriptive bulletin.

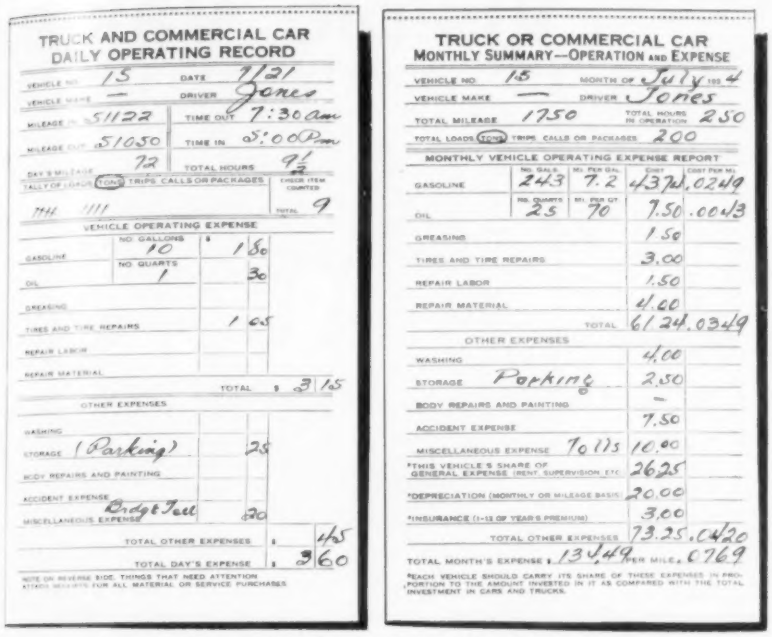
CHAS. HVASS & CO., Inc. 508 East 19th Street, New York City



When there's a time limit on the job—
When every hour lost is a serious matter—
Then does the contractor appreciate the rugged reliability of his

BUFFALO-SPRINGFIELD ROLLER

THE BUFFALO-SPRINGFIELD ROLLER CO.
Springfield, Ohio



TRUCK AND COMMERCIAL CAR
DAILY OPERATING RECORD

VEHICLE NO. 15 DATE 9/21
VEHICLE MAKE — DRIVER Jones
MILEAGE IN 51122 TIME OUT 7:30 am
MILEAGE OUT 51050 TIME IN 5:00 Pm
72 TOTAL HOURS 9½
DAY'S MILEAGE
TALLY OF LOADS (TONS) TRIPS CALLS OR PACKAGES CHECK ITEM COUNTED
THH IIII TOTAL 9

VEHICLE OPERATING EXPENSE

		$
GASOLINE	NO. GALLONS 10	1 80
OIL	NO. QUARTS 1	30
GREASING		
TIRES AND TIRE REPAIRS		1 65
REPAIR LABOR		
REPAIR MATERIAL		
	TOTAL	$ 3 15

OTHER EXPENSES

WASHING		
STORAGE (Parking)		25
BODY REPAIRS AND PAINTING		
ACCIDENT EXPENSE		
MISCELLANEOUS EXPENSE Bridge Toll		20
TOTAL OTHER EXPENSES	$	45
TOTAL DAY'S EXPENSE	$	3 60

NOTE ON REVERSE SIDE, THINGS THAT NEED ATTENTION
ATTACH RECEIPTS FOR ALL MATERIAL OR SERVICE PURCHASES

TRUCK OR COMMERCIAL CAR
MONTHLY SUMMARY—OPERATION AND EXPENSE

VEHICLE NO. 15 MONTH OF July 1934
VEHICLE MAKE — DRIVER Jones
TOTAL MILEAGE 1750 TOTAL HOURS IN OPERATION 250
TOTAL LOADS (TONS) TRIPS CALLS OR PACKAGES 200

MONTHLY VEHICLE OPERATING EXPENSE REPORT

	No. GAL'S	MI. PER GAL	COST	COST PER MI.
GASOLINE	243	7.2	43 74	.0249
	No. QUARTS	MI. PER QT		
OIL	25	70	7.50	.0043
GREASING			1 50	
TIRES AND TIRE REPAIRS			3.00	
REPAIR LABOR			1.50	
REPAIR MATERIAL			4.00	
TOTAL			61 24	.0349

OTHER EXPENSES

WASHING	4.00	
STORAGE Parking	2.50	
BODY REPAIRS AND PAINTING	—	
ACCIDENT EXPENSE	7.50	
MISCELLANEOUS EXPENSE Tolls	10.00	
*THIS VEHICLE'S SHARE OF GENERAL EXPENSE (RENT, SUPERVISION, ETC.)	26.25	
*DEPRECIATION (MONTHLY OR MILEAGE BASIS)	20.00	
*INSURANCE (1-12 OF YEAR'S PREMIUM)	3.00	
TOTAL OTHER EXPENSES	73.25	.0420
TOTAL MONTH'S EXPENSE $ 134 49 PER MILE		.0769

*EACH VEHICLE SHOULD CARRY ITS SHARE OF THESE EXPENSES IN PROPORTION TO THE AMOUNT INVESTED IN IT AS COMPARED WITH THE TOTAL INVESTMENT IN CARS AND TRUCKS.

SAMPLE PAGES FROM THE COST RECORD BOOK BEING DISTRIBUTED BY THE COMMERCIAL CAR DEPARTMENT OF THE CHEVROLET MOTOR COMPANY

Motor Truck Cost System

Public officials who want to know how much motor truck operation costs, which drivers are doing the best jobs, which type and make of equipment is the most economical, and which vehicles are costing so much that they should be replaced, can ascertain this with a minimum of paper work by the use of a copyrighted "Owners' Simplified Operating Record," made available free of charge to all operators by W. E. Fish, Manager, Commercial Car Dept., Chevrolet Motor Co., Detroit, Mich.

The new simplified operating record, according to Mr. Fish, is especially well designed to fit the needs of the individual operators of small fleets of trucks, who comprise about 80 per cent of all owners. The system provides the owner with a small record book, one for each vehicle, containing a sheet for each day's record, to be filled in by the driver, and a monthly summary sheet on which the daily entries are totaled. Comparison of the summaries at the end of the month will give a definite figure on the relative operating costs of the vehicles in use. The simplicity of the record system is illustrated by the method of computing the total daily gasoline consumption. Each vehicle begins its day's work with a full tank. At the end of the day the driver refills the tank. The quantity required to fill is the total number of gallons actually used by the truck that day. At the end of the month, the summary of operation and expense reveals, for each truck, items such as the total mileage, hours and loads (tons, trips, calls, and packages), total fuel and oil and mileage per gallon or quart, fuel and oil cost per mile. Operating expense and other costs are kept separate, each being reduced to cost per mile.

A Police Alarm Transmitter for Cities of Small and Medium Sizes

A new police alarm transmitter known as the Gamewell Westinghouse Type EB 50-watt, has been brought out by The Westinghouse Electric & Manufacturing Co., Radio Division, Chicopee Falls, Mass. This transmitter is a 50-watt, fully modulated, broadcast transmitter, designed especially for police communication service. It is capable of providing the maximum signal strength allowed by the Federal Radio Commission for cities having up to 100,000 population. It is small, light in weight, and self-contained, requiring only the connection to the antenna ground system and to the electric light circuit. All parts except the antenna-ground system are supplied.

Some of the special features of this transmitter are its carrier rating of 50 watts; a voice and tone modulation of 100 per cent capability; a response quality of from 100 to 5,000 cycles; and a radio frequency range of 1,500 to 3,000 KC. It is especially designed with static shield to minimize harmonic radiation and arranged for either antenna or transmission line, and a total of nine tubes is required. It contains no batteries and has no bias rectifier and is 16 x 24 x 34 inches high. It weighs 223 pounds complete with tubes, less the microphone.

Where conditions require, this Type EB transmitter may be arranged for operation from other power supplies and can be made to connect to a telephone line for remote operation.

The Gamewell Co., Newton, Mass., is the exclusive distributor of Westinghouse police radio equipment in the United States, east of the Rockies.

Vice-President of Hardinge Returns from Europe

Harlowe Hardinge, Vice-President and General Manager of Hardinge Co., Inc., York, Pa., has recently returned from Europe, where he has been actively engaged in handling matters in connection with the foreign interests of the company. Mr. Hardinge reports business in England as excellent, up to that of 1928 and 1929.

Allis-Chalmers Moves District Office

Allis-Chalmers Manufacturing Co., Milwaukee, Wis., has announced the removal of its Chicago District Office to the new Field Building, 135 South La Salle Street, Chicago, Ill. B. F. Bilsland is Manager of the Chicago District. With this move Allis-Chalmers returns to its original location, for the new Field Building stands on the site of the old Home Insurance Building, where the general offices of the Allis-Chalmers Co. were first located after the company was organized in 1901.

GAMEWELL WESTINGHOUSE TYPE EB POLICE ALARM TRANSMITTER

Safety Lighting

for Railroad Crossings and Underpasses

Cat. No. 5566—Symmetrical Angle Reflector with Bull's Eye

Benjamin

Warning Signal Lighting Fixtures

A combination warning signal and lighting unit. At viaducts or elevated railroad crossings it illuminates the substructure piers; at grade crossings it directs a flood of light upon the crossing sign and roadway. The ruby glass lens in the back of the reflector warns drivers to approach cautiously. Porcelain enameled steel reflector and fittings are weather-resisting for exposure under severe service conditions. Samples will be submitted on request.

Cat. No. 32613 — Elliptical Angle Reflector with Bull's Eye

Floodlighting

for Playgrounds, Soft Ball Fields, Football Fields, Tennis Courts and other Outdoor Recreational Areas.

Specially designed for various outdoor recreational areas. Porcelain enameled steel reflectors never need repainting or refinishing. All fittings rugged, durable and weather-resisting. Benjamin "Play-Area" and "Duo-Service" Floodlights are equipped with patented "Saflox" Floodlight Lowering Attachment which facilitates cleaning and relamping.

Send for new bulletin on outdoor recreational lighting.

Benjamin Electric Mfg. Co.

Des Plaines, Ill.

New York Chicago San Francisco

BENJAMIN TRADE MARK

Visible Value!

5 NEW FEATURES *Decided* THE FENCE TO BUY

● Like the Century of Progress Exposition at Chicago, Continental Fence will appeal to you on the basis of *visible value*—features that are not to be found elsewhere.

Here are a few of the many *visible value* features in *Continental Fence*: Heavier and stronger H-section line posts; new top rail coupling, 7 in. long, that fits inside as well as outside; barb wire attached to post arm in angle slot, being automatically locked in position; new tension locking pin that eliminates all bolts and nuts in holding fabric to terminal posts; improved pivot type hinges that insure perfect operation of gates without any maintenance. Send now for new catalog that tells why Continental fence *offers lower cost per year of service.*

CONTINENTAL STEEL CORPORATION

Dept. C, Kokomo, Ind.

Manufacturers of Billets, Rods, Wire, Barbed Wire, Nails; Chain-Link, Lawn, Farm and Poultry Fence and Gates; Black, Galvanized, Galvannealed and Special Coated Sheets; Galvanized Roofing; (also "Seal of Quality" Roofing) and Kindred Products.

NRA

CONTINENTAL

TRADE MARK REG U.S PAT. OFF

Chain Link FENCE

OFFERS LOWER COST PER YEAR OF SERVICE

THE PITTSBURGH HIGHWAY GUARD

A Safety Highway Guard for Accident Prevention

The new Pittsburgh safety highway guard, made by E. L. Benedict and Associates, Union Trust Building, Pittsburgh, Pa., affords a new degree of safety for vehicles. The guard is a 14-inch band woven under tension from spring steel wire of high tensile strength, with an elastic limit equal to approximately 95 per cent of its ultimate strength. It develops under test a total breaking strength of more than 50 tons. Its strength is developed by the main or longitudinal wires running parallel to each other continuously throughout the length of the band. The ability to absorb and distribute shock is one of the features of this guard. It is placed at a position on the posts so that the bumper or wheels of a car leaving the highway will strike the guard and be deflected back toward the roadway without striking the posts. It has high visibility due to its width and heavy zinc-coated finish. It can be painted white or checkered black and white to increase visibility further. It is easily erected and can be readily handled by the regular highway maintenance crew.

Guard posts of either steel or wood are recommended to be placed 16 feet on center, but may be spaced at any distance that conditions justify. The clamps to attach the guard band to the posts are designed to allow free movement of the band and thus distribute the impact of shocks. Also, the resilience of the band amply compensates for all temperature changes and keeps the band in taut position. This guard is manufactured in standard rolls of 500 lineal feet.

Non-Clogging Centrifugal Pumps

Horizontal non-clogging pumps designed for sewage plants, reduction plants, drainage and irrigation plants and other similar applications have recently been announced by the Economy Pumping Machinery Co., 3431 West 48th Place, Chicago, Ill. These pumps are capable of passing solids approximately the size of the discharge connection and handle rags, sticks, stones, and other trash without clogging. They are extensively used for pumping all kinds of pulpy liquids and may be substituted to advantage for other types of conveying equipment in food plants, paper mills, reduction plants, sewage disposal plants, laundries, etc. The installation of these pumps does not call for complicated piping and follows closely the standard practice for centrifugal clear-water pumps.

The pump casing or volute of the pumps is of semi-steel especially designed to efficiently handle water containing a large percentage of solids without clogging and with minimum wear. It is arranged for use with impellers of various diameters by merely changing spacer rings. The impeller is ordinarily of bronze, two-blade wide waterway type, designed to handle materials with high efficiency. It is locked on the shaft between a shoulder and a countersunk nut so that there are no protruding hubs or surfaces about which rags or string may twist. The weight of the shaft and impeller is carried on two widely separated anti-friction bearings which are designed to carry any thrust which may be present in addition to the radial load. Shock bearings in the pump prevent deflection of the shaft when stones or other heavy objects enter the impeller. The bearing surrounds the impeller hub, which is encased in a steel sleeve or journal which makes a completely renewable shock bearing and prolongs the life of the shaft sleeves and packing. The shaft is of alloy steel, heat-treated, turned and ground all over, and is of large diameter, designed for heavy service.

These horizontal pumps are driven by motors, gasoline engines, belts, chains or gears and come in a full range of sizes

Sheeler Made General Sales Manager of Coldwell

The Coldwell Lawn Mower Co., of Newburgh, N. Y., has announced the appointment of George W. Sheeler as General Sales Manager. Mr. Sheeler has represented the Coldwell Lawn Mower Co. in New York and New England for the past eleven years.

He is an experienced lawn mower man, thoroughly conversant with the grass problems that are found prevailing in the parks and playground areas of many states. Mr. Sheeler was graduated from the Pennsylvania State School of Forestry in 1912. He was in the Pennsylvania Forestry Service, and while engaged in this service many allied problems such as tree plantings, landscaping, insect damages and fungus control features were part of his program for the woodland parks and shade trees of many municipalities. In 1917 he left this service to enlist for war service in the Tenth Engineers, a Forestry Regiment, and spent twenty-two months in France and was commissioned Second Lieutenant, Corps of Engineers of the Army Engineering School at Langres, France. After the war he became identified with the lawn mower industry. He was factory manager in charge of production and since 1921 has been selling hand mower, power mower and gang mower equipment. He joined the Coldwell Sales Organization in 1923, and represents them in New York and New England.

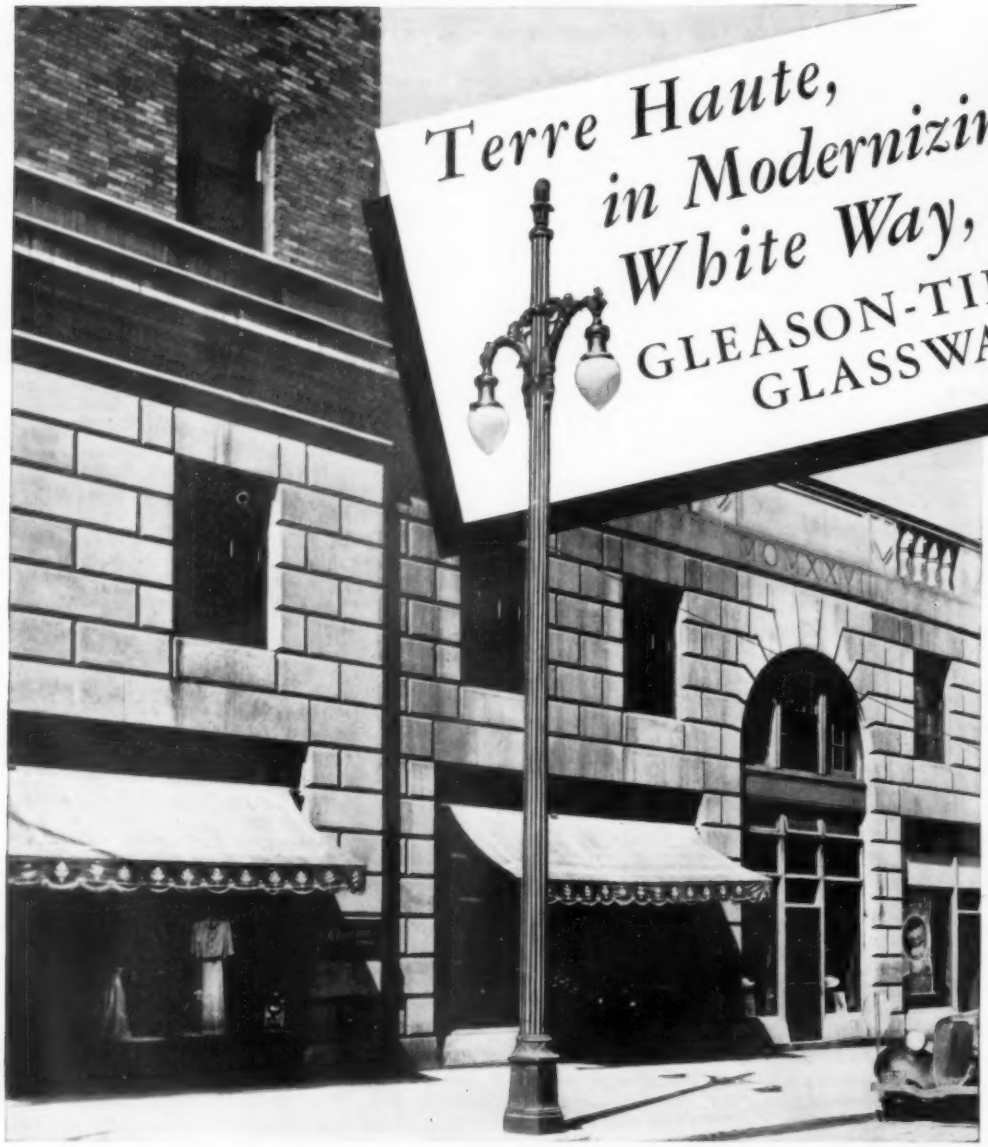
Automatic Chloramine

Making up one solution of hypo-chlorite with aqua ammonia or ammonium sulphate has not been successful because the combined solution is unstable and quickly loses strength. An ideal way of procuring consistent chloramine treatment has been brought out by Proportioneers, Inc., 9 Codding St., Providence, R. I., which consists of using the two solutions separately, since each solution by itself is stable. These two solutions flow through two Chlor-O-Feeders, and the stroking rates are kept in step with variable water flow through a single water meter. In this way, both chemicals will be fed in step with flow variations, but the dosage of each can be separately adjusted by the operator. With this system, the two chemicals do not meet before injection into the water line.

Feeding Gas to Balloons for Birmingham Races

Domestic gas from the mains of the Birmingham Gas Co. was used to inflate the five balloons which competed in the national balloon races recently held in Birmingham, Ala. The races were sponsored as a civic enterprise for charitable purposes. The problem of conveying gas to the balloons was solved by tapping the Birmingham Gas Co. main at the stadium entrance and running a 10-inch Mono-Cast Doublex Simplex cast iron pipe line on top of the ground down the length of the field, as shown in the accompanying photograph. The gas was fed to the balloons through staggered services to which were attached gas-tight cloth tubes. The gas was donated by the Birmingham Gas Co., and the pipe line by the American Cast Iron Pipe Co., Birmingham, Ala.

BALLOONS AT BIRMINGHAM ABOUT ONE-FOURTH INFLATED



A 2-light standard on Wabash Ave., Terre Haute. Gleason-Tiebout Form 146 light-alabaster globe

TERRE HAUTE has replaced its entire obsolete white-way lighting equipment with 6000- and 10,000-lumen units, and with new poles, cable, control, refractors, and Gleason-Tiebout glassware. Here, 164 globes are used on the 2-light standards through the center of the business district, and 183 globes are installed on single-light standards in the rest of the downtown section.

Here is a city that is meeting new business with new lighting. It has brought up-to-date its lighting equipment. Have you recently looked at the lighting of your white way — to see if you, too, should not modernize?

Gleason-Tiebout makes glassware to meet the exacting specifications of General Electric engineers. These engineers will be glad to help you in laying out your street-lighting installation.

GT-30

GLEASON-TIEBOUT GLASS COMPANY

99 COMMERCIAL STREET, BROOKLYN, N. Y.

Why not remember to mention THE AMERICAN CITY?

Outdoor Lighting

A Section of *The American City*
Devoted to the Lighting of Streets, Highways, Bridges, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

"Every City Has Money Enough for Better Street Lighting"

THE frequently alleged smallness of the world is suggested again by certain familiar phrases in a recent article published in *Board & Council*, the official organ of the municipal associations of New Zealand, published at Auckland.

In New Zealand, it seems, as elsewhere, even in the rich and electrically advanced United States, the average city will be found to have certain streets and districts that are well lighted, and others "that are outlined with lamps of such insignificance that they serve merely as street markers." The article is entitled "The Financial Aspect of Good Lighting," and proceeds as follows:

"The poorer districts and alleys, which are notoriously badly lighted, require good street illumination to as great, if not to a greater, extent than the better-class districts. It should not be inferred by this that costly street-lighting equipment of a highly ornamental character should be installed in the poorer-class districts, but rather that the standard of illumination in districts producing smaller revenues from taxation should be as high as that in the better-class districts.

"Real-estate operators recognize the advantages of good street lighting when preparing their properties for the market, and it is not uncommon for the street-lighting system to be advertised as one of the attractive features of the subdivision.

"Good street lighting pays for itself in enhanced taxable values, and the same conditions that make it an asset to real-estate developments make lighting a financially desirable improvement for the city as a whole. Good street lighting improves the character of adjacent buildings, encourages better-class stores, and raises the district from poverty to prosperity. *Every city has money enough for better street lighting.*"

It is a deplorable fact that municipal authorities are apt to attach too much importance to the cost of adequate street lighting and to overlook the cost of inadequate street lighting. If accidents or crime due to inadequate street lighting resulted in the punishment of those responsible for such lighting, municipal officials would undoubtedly show a greater interest in street lighting!

Lighting Light and Dark Surfaces

IN the problem of street and highway lighting the question of road surfaces is coming more and more to the fore, said Arthur F. Loewe, of the General Electric Co., at the last annual meeting of the Highway Research Board. The surfaces in common use are portland cement concrete, bituminous macadam and sheet asphalt, and each behaves differently under lighting.

Seeing on the street is quite different from seeing in the office. The amount of light provided on the street, even in properly designed systems, is of such a low level that in the majority of cases it is impossible to see by direct light reflected from the object. Therefore, it is necessary to rely on silhouette vision, the requisite for which is a lighted background against which the object can be seen in relief. This background is the road, and the ease with which the silhouette of an object upon the road is perceived is determined by the brightness of the surface.

The three types of surfaces named reflect light differently. Sheet asphalt when polished by traffic acts as a mirror or water surface reflecting light in streaks or specularly. Bituminous macadam reflects as does a blotter, diffusing or scattering the rays in all directions. Concrete does, too, but the dispersion varies with the roughness of the road. Concrete and bituminous macadam reflect specularly when wet, as is characteristic with all wet surfaces. The reflection factor of concrete is about 80 per cent and 4 per cent for asphalt and bituminous macadam.

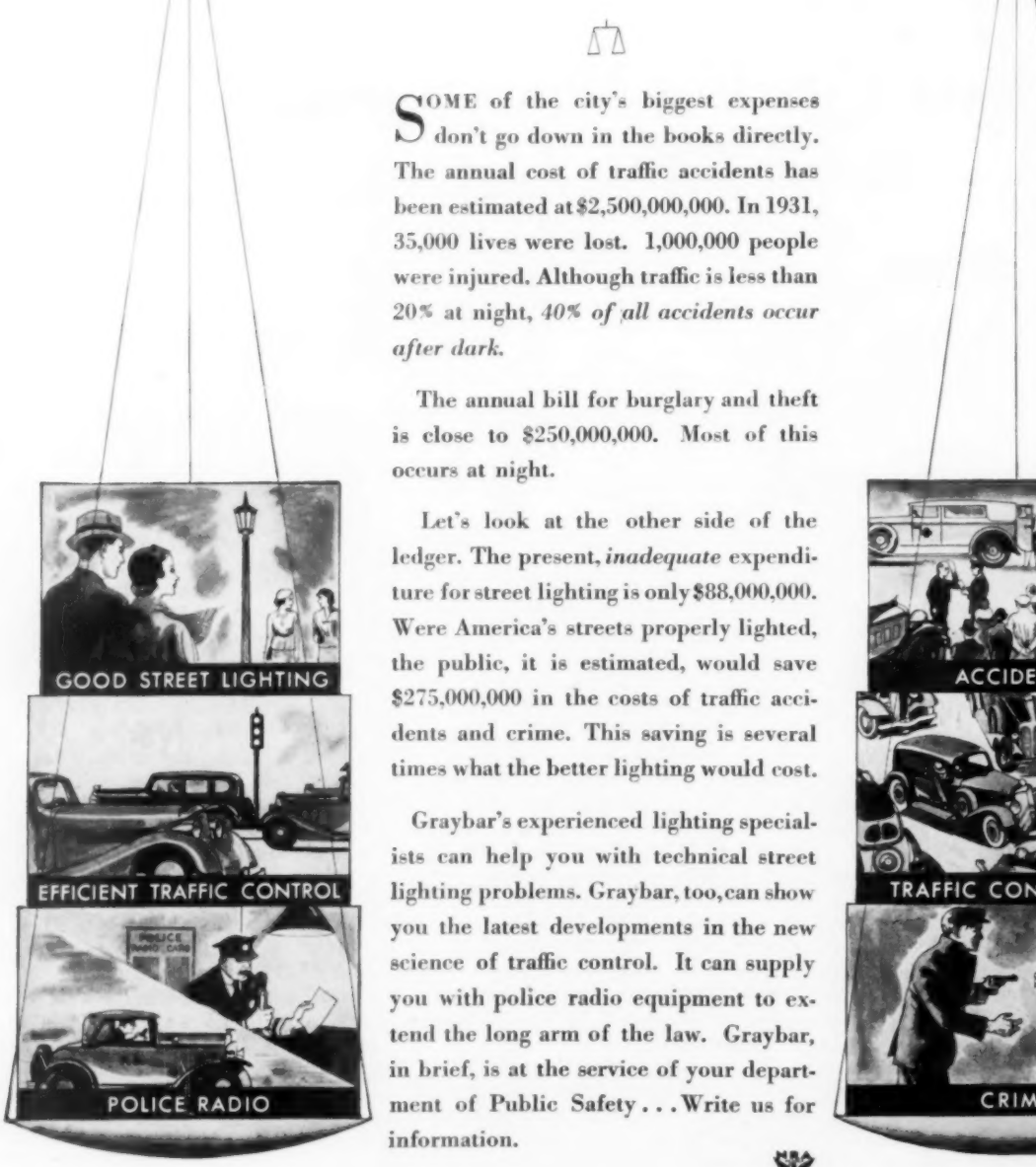
Since visibility under street lighting is dependent on the surface which provides a background for brightness, it is desirable to compare the brightnesses of the three surfaces. Sheet asphalt is the brightest when viewed between the observer and the lamp, but the brightness which is 4 per cent of the light is confined to a strip very little wider than the light source itself, though this strip may be 1,000 feet long. An object in line with the strip of brightness is easily seen, but if it is on one side it is invisible.

Bituminous macadam, reflecting diffusely, gives only a circle of relatively low brightness, since the 4 per cent is scattered in all directions. Hence it is necessary for equal visibility on this type of surface to use a larger lamp or a greater number of smaller ones.

Concrete, dispersing the light in all directions and with its high reflection factor, causes the entire width of the roadway to become a background when the lamps are properly mounted as to height, distance over the traveled portion of the roadway, and distance between the lamps.

An example of the difference between light and dark surfaces was provided by the Pulaski Highway in New Jersey. This highway became blackened, and it was apparent that the 6,000-lumen lamps would have to be replaced by 10,000's. But the winter traffic protected by chains and cinders scoured the surface back to its light color.

To Budget Balancers:



SOME of the city's biggest expenses don't go down in the books directly. The annual cost of traffic accidents has been estimated at $2,500,000,000. In 1931, 35,000 lives were lost. 1,000,000 people were injured. Although traffic is less than 20% at night, *40% of all accidents occur after dark.*

The annual bill for burglary and theft is close to $250,000,000. Most of this occurs at night.

Let's look at the other side of the ledger. The present, *inadequate* expenditure for street lighting is only $88,000,000. Were America's streets properly lighted, the public, it is estimated, would save $275,000,000 in the costs of traffic accidents and crime. This saving is several times what the better lighting would cost.

Graybar's experienced lighting specialists can help you with technical street lighting problems. Graybar, too, can show you the latest developments in the new science of traffic control. It can supply you with police radio equipment to extend the long arm of the law. Graybar, in brief, is at the service of your department of Public Safety . . . Write us for information.

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Portable Generator for Floodlighting

A COMPACT light-weight portable floodlighting system for night operations has been developed by the Homelite Corporation, Port Chester, N. Y. The generator is of 1,250-watt capacity, 110-volt a-c or d-c. It weighs 89 pounds complete with built-in gasoline engine.

The Jersey City Water Department used four of these generators for lighting inside a 6-foot steel main while cleaning out rust and scale preparatory to applying a protective coating on the inside. The unit has been used similarly by sewer departments, in which work it has obvious advantages over an open flame. Fire departments have been the largest buyers.

In the daytime the generator can be used for operating electric tools. For instance, at Elizabeth, N. J., a contractor used it to operate an electric sander for smoothing the inside of his forms for a retaining wall before pouring, thus incidentally saving 2 cents per square foot on the finishing.

Lighting the Monument to the Revolution at Mexico City

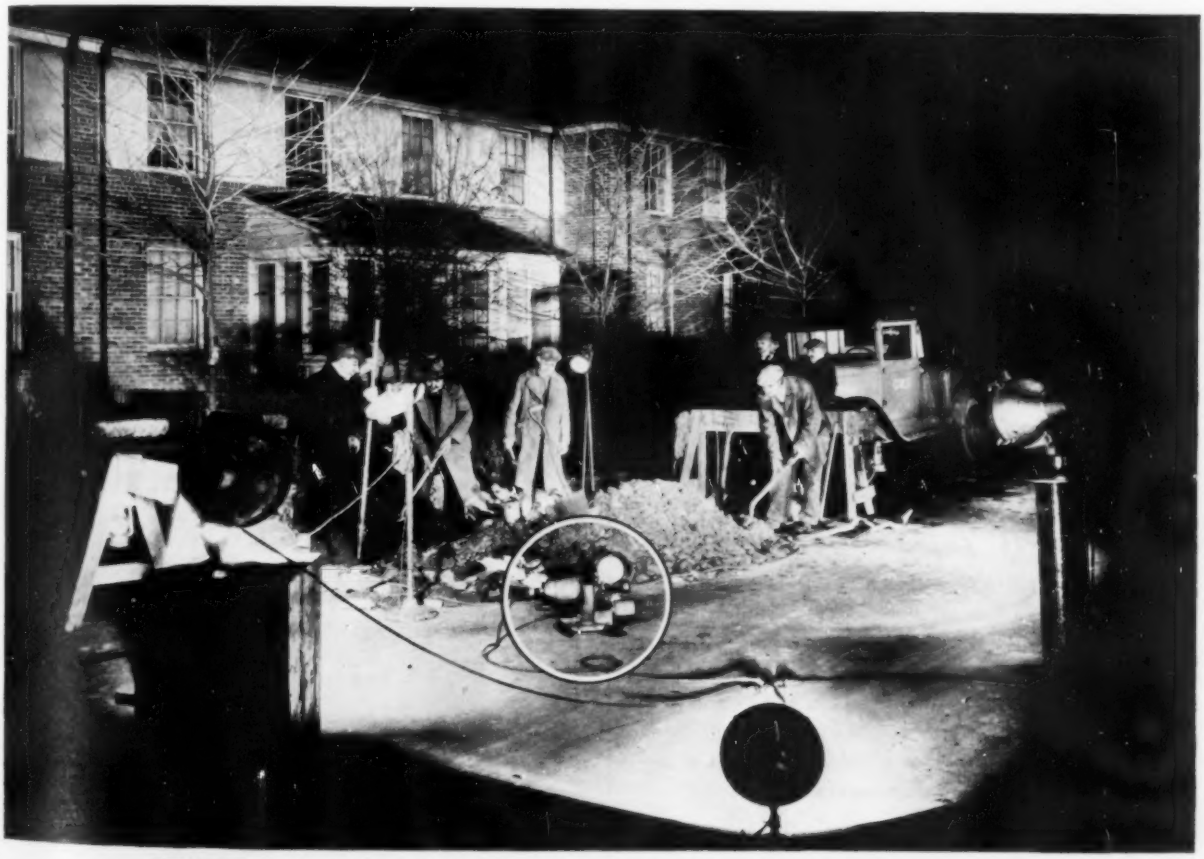
THE new Monument to the Revolution in Mexico City was designed by Carlos Obregon Santacilia. It consists of four archways supporting a colonnade surmounted by a dome covered by sheet copper. The monument is 110 feet square by 205 feet high. Its cost was $1,000,000.

At night the monument is illuminated by floodlights playing on the four architectural ornaments at the corners of the arches, the colonnade beneath the dome, the cupola, and the large inner dome. A 5,000-watt searchlight 36 inches in diameter located in a small upper dome aims straight up at the sky.

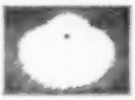
The lighting equipment consists of the searchlight, 328 Novalux projectors of 100 to 1,000 watts, and 18 submersible projectors to illuminate two electric fountains on two sides of the base of the monument. There are more than 500 reflectors.

Around the base are ornamental standards for lighting the 100 x 600-foot plaza. Four of the standards have three projectors each, for lighting the corner sculptural groups. The two cascades take 1,000 gallons of water per minute.

THE MONUMENT AT NIGHT



REPAIRING BROKEN WATER MAIN AT WOODSIDE, L. I., N. Y., UNDER PORTABLE FLOODLIGHT



Holophane Refractor for wide streets gives this type of light distribution. Units at curb — closely spaced.

A Highway Refractor produces a long, narrow ribbon of light.

For wider spacing, and longer reach of light, there is another Holophane Refractor.

For intersections there is a Refractor which produces a separate beam for each roadway.

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Holophane Trade Mark

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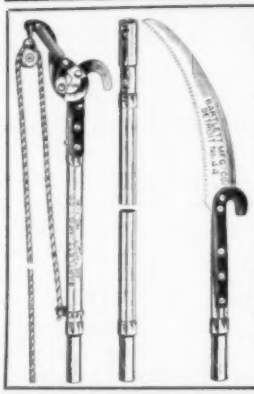
Illumination Service Since 1898



Bartlett No. 1-W Combination Tree Trimmers and Saws

The Tree Trimmer: a powerful tool, will sever any branch up to 1¼ in. diameter with slightest effort. Very light in weight. Mounted on 1¼-inch octagon pole with a round ferrule at lower end to attach extra sections, over-all length, 30 inches. (If desired user can supply own sections.)

Sections furnished in 6- and 8-ft. lengths. Lock automatically to upper part and will not come apart. Two or more sections can be used to obtain height desired.

The Pole Saw: has special teeth that retain their sharpness. Make sawing rapid and effortless. Mounted on 1¼-inch octagon pole, overall length, 30 in.—extensions same as those used for tree trimmer.

All Bartlett tools are guaranteed. Catalog and prices will be sent on request.

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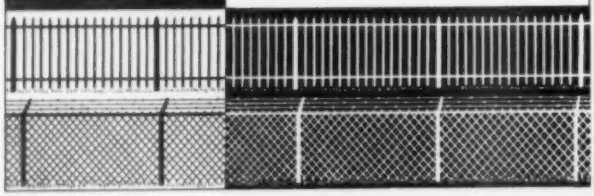

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Readers of THE AMERICAN CITY desiring to secure catalog or price lists on any sort of machinery equipment or supplies for municipal or county work are invited to state their wishes to the Catalog and Price List Department, The American City, 470 Fourth Ave., New York. One letter to us will secure you the information you desire free of all charge, and at a considerable saving of time and correspondence.

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The American City

Public Works and the Recovery Program

The President Pledges the Abolition of Unemployment Relief Rolls

TO those who say that our expenditures for public works and other means for recovery are a waste that we cannot afford, I answer that no country, however rich, can afford the waste of its human resources. Demoralization caused by vast unemployment is our greatest extravagance. Morally, it is the greatest menace to our social order.

Some people try to tell me that we must make up our minds that for the future we shall permanently have millions of unemployed just as other countries have had them for over a decade. What may be necessary for those countries is not my responsibility to determine. But as for this country, I stand or fall by my refusal to accept as a necessary condition of our future a permanent army of unemployed. On the contrary, we must make it a national principle that we will not tolerate a large army of unemployed, and that we will arrange our national economy to end our present unemployment as soon as we can and then to take wise measures against its return. I do not want to think that it is the destiny of any American to remain permanently on relief rolls. . . .

I believe with Abraham Lincoln that "the legitimate object of government is to do for a community of people whatever they need to have done but cannot do at all or cannot do so well for themselves in their separate and individual capacities."

—From the Radio Address Delivered from the White House on September 30 by President Roosevelt.